

Historic, Archive Document

Do not assume content reflects current scientific knowledge, policies, or practices.



THE
QUEENSLAND AGRICULTURAL JOURNAL,

ISSUED BY DIRECTION OF

THE HON. THE SECRETARY FOR AGRICULTURE.

EDITED BY A. J. BOYD F.R.G.S.Q.

NEW SERIES.

VOLUME XIV.

JULY TO DECEMBER, 1920.

BY AUTHORITY :
ANTHONY JAMES CUMMING, GOVERNMENT PRINTER, BRISBANE.

1920.

QUEENSLAND AGRICULTURAL JOURNAL.

VOL. XIV. PARTS 1 TO 6.

GENERAL INDEX.

	Page.		Page.
A.		C.	
A Beetle Attacking Granadillas	36	Cocoa, Root Disease of	241
About Muscovy Ducklings	276	California, Citrus-growing in	237
A British Substitute for Cotton	153	California, Irrigation in	213
A Cement Barrel, To Glaze	238	Cane Fields of the Central District	200
A Cement Floor for Cow Bails	267	Cane Grub Investigation 35, 148, 198, 245, 302	302
A Family's Experience in Poultry-farming	276	Cane Planting in Java	73
A New Cactus Rubber	239	Causes of the Periodical Retrogression of the Bee-keeping Industry in Australia	294
A New Fruit Evaporator	154	Cement Barrel, To Glaze a	
A New Immune Potato	7	Cement for Floor of Cowbails	
A Pestilent Weed	141	Chicken Pox, More about	20, 22
A Rapid Earth Borer	59	Chinese Langshan Fowls	136
A Remarkable Rubber Discovery	200	Citrus-growing in California	237
A Sun-dial, To Construct	201	Coconut, The Dwarf	258
A Watch as a Compass	154	Coconuts, Variation in	144
A Wonderful Instrument	267	Coffee-growing in Queensland	191, 280
Agricultural Districts, Rainfall in the 48, 88, 161, 203, 256, 296		Coffee, Imports of	247
Agriculture 1, 49, 89, 165, 212, 257		Combating Red and Black Ants	77
Answers to Correspondents 79, 155, 201, 247, 309		Comparative Cost of Cheese and Butter-making	62
Ants, Red and White, Combating	77	Construction of a Sundial	201
Ants, To Destroy	247	Contents of a Silage Stack	155
Ants, White, Poisoning	76	Corn-growing Competition	125, 165
Apiculture	294	Corns in Horses, Prevention of	130
Armstrong, Whitworth, and Civil Engineering	29	Correspondents, Answers to 155, 201, 247, 309	
Astronomical Data 46, 86, 162, 210, 254, 316		Cost of Sugar-growing and Manufacture in 1920	308
August, Farm and Garden Notes for	44	Cotton-growing in Arizona	6
August, Orchard Notes for	44	Cotton-growing Industry in Queensland	257
B.		Cotton Industry and "The Times"	53
Bananas, Bunchy Top in	182	Cotton Industry in America	6
Bananas, Root Disease of	297	Cotton-planting	56
Bark of Eucalypts, Variation in the	70	Cotton Plants, Perennial 49, 78	
Bean, The Algaroba	8	Cotton Proof against Damage by Rain	54
Bean, The Sword	79	Cotton Prospects for 1920-1921	219
Bee-keeping Industry of Australia	294	Cotton, Short and Long Stapled	52
Beetle Attacking the Granadilla	36	Cotton Shortage	11
Bitting and Breaking Horses	262	Cotton Situation—Factors that Count	220
Black Bean Seeds for Stock Food	293	Cotton, The Spacing of	183
Blight, Irish, in Potatoes 57, 79		Cotton Situation, The American	308
Blight, Irish, To Prevent	69	Cows, Dehorning	264
Blown Sheep, The Use of Bluestone on	309	Cream and Butter	247
Blow-fly Maggots—Important Discovery	222	Cultivation of Sweet Peas	138
Bluestone for Blown Sheep	309	Cutting and Milling Cane, Loss between	277
Botany 30, 70, 146, 196, 243, 289			
Breeders of Pure-bred Stock	127, 259		
British Substitute for Cotton	153		

	Page.		Page.
D.		G.	
Dairy Cows, Characteristics of ...	17	General Notes ...	36, 77, 183, 200, 247, 305
Dairying ...	17, 61, 129, 173, 223, 263	Goats as Milkers ...	...
December, Farm, Garden and Orchard	...	Grain for Sale ...	170
Notes for ...	251	Granadillas, A Beetle Attacking ...	36
Dehorning Cows ...	264	Growing Rice ...	184
Departmental Announcements ...	xvii, xv.	Gunpowder in Mines, First Use of ...	201
Device for Sheep Penning ...	60		
Distinction between the Milking Short-	...	H.	
horn and the Illawarra Shorthorn ...	61	Helping the Hospitals ...	304
District Exhibits at the Exhibition of	...	Hides, Tanning ...	195
1920 ...	107, 111	Hog Skins, Tanning ...	38
Do Horns Tell Age? ...	126	Horns: Do They Tell Age? ...	126
Do We Over-feed Milk? ...	263	Horses ...	63, 130, 236, 262
<i>Doticus (D. Pestilens?)</i> ...	36	Horses, Biting and Breaking ...	262
Ducklings, Muscovy ...	276	Horses, Prevention of Corns in ...	130
Ducks, Muscovy, More Should be Raised	68	Horticulture ...	138
Dutch, or Friesian Cattle ...	129	How Forestry Increases the Farm	...
		Income ...	306
E.		How the Blind can Read ...	306
Early Sugar Mills of Queensland ...	285	How to Feed Silage ...	93
Earth Thrust Borer, A Rapid ...	59	How to Get Rid of Warts on Cattle ...	155
Egg-laying Competitions, Q.A. College	18,		
66, 131, 174, 224, 268	...	I.	
Enoggera Sales 41, 81, 157, 205, 249, 311	...	Illawarra and Milking Shorthorns ...	61
Entomology ...	35, 74, 148, 198, 245, 302	Illustrated Notes on the Weeds of	...
Egg-laying Competitions at the Queens-	...	Queensland ...	30, 196, 243
land Agricultural College, 1920, Final	...	Immune Potato, A New ...	7
Report ...	177, 192, 272	Important Discovery—The Blow-fly	...
Eradicating Fruit Pests ...	25	Maggot ...	222
Eradication of Prickly-pear ...	73	Imports of Coffee ...	247
Eradication of Sorrel ...	295	Industries, Neglected, Tobacco ...	12
Eradication of White Wax Scale ...	238	Industries, Tropical ...	27, 142, 181, 239, 279
Exhibition Notes ...	107	Interstate Special Fruit Trains ...	242
Exhibition Sales ...	155	Irish Blight, To Prevent ...	57, 69
Exhibits of the Department of Agricul-	...	Irrigation for the Woongarra Scrub	56, 103
ture ...	119	Irrigation Methods in California ...	23
Experiments in the Destruction of White	...		
Wax Scale ...	238	J.	
Experiments with a New Cactus Rubber	239	January, Orchard Notes for ...	312
		Java, Cane-planting in ...	73
F.		July, London Quotations for ...	77
Farm and Garden Notes 43, 83, 159, 208, 251	...	Juvenile Corn-growing Competition, 1920	125
Farm Produce, Prices of 40, 80, 156, 204, 248	...		
Farm-yard Manure ...	214	K.	
Farmers—Pisé Buildings for ...	213	Kurrajong, The North Australian ...	291
Farmers' Sheep on Coastal Lands ...	171		
Feeding Experiments with Dried Blood	89	L.	
Feeding Pigs on Dried Blood ...	223	Langshan Fowls, Chinese ...	136
Fertilising Plant Seeds before Sowing ...	9	Lemon Growing at Moorooka ...	26
Field Hospitals ...	201	London Quotations ...	77
Final Report of the Egg-laying Com-	...	"London Times" and the Cotton Indus-	...
petition at the Q.A. College for 1920	133,	try ...	53
177, 192, 272	...	Loss between Cutting and Milling Cane	277
First Use of Gunpowder in Mines ...	...	
Flax-growing ...	307	M.	
Flying Foxes, Life History of ...	4, 74	Manure, Farmyard ...	214
Fordson Tractor ...	10	Markets ...	40, 80, 156, 204, 248, 310
Forestry, How it Affects the Farm	...	Maroochy Sugar District ...	27
Income ...	306	Meggitt, Limited ...	77
Fowl Tick ...	...	
Fowls, Roup in ...	155		
Fresian or Dutch Cattle ...	129		
Fruit-eating Birds and Rats, War on ...	153		
Fruit Evaporator, A New ...	154		
Fruit-growing in California ...	23		
Fruit Pests, Eradicating ...	25		
Fruit, Prices of, in the Southern	...		
Markets ...	41, 81, 157, 205, 249		
Fruit, Prices of, in the Turbot Street	...		
Markets ...	41, 81, 157, 205, 249		
Fruit, Taking Water out of ...	223		
Fruit Trains, Interstate Special ...	242		

	Page.
Mezquit Bean	8
Milch Goats	265
Milk for Pigs: Do we Overfeed it? ...	
Milking and Illawarra Shorthorn, Dis- tinction between the	61
Mint-growing for Oil	200
Money (Paper) First Issued	201
More about Chicken Pox	20, 22
Muscovy Ducks	68

N.

Natural History	74
Needle Burr	30
Neglected Industries (Tobacco), Rice, and Coffee	12, 184
New Fruit Evaporator	154
New Immune Potato	7
Nipah Palm, Sugar and Alcohol from the	202
North Australian Kurrajong	291
Northern Sugar Plantations	181
Notes, Farm and Garden 43, 85, 159, 208, 251, 312	
Notes, General 36, 77, 153, 200, 247, 305	
Notes on the Variation in the Bark of Two Common Eucalypti	70
Notes on the Weeds of Queensland 196, 243	
Notes, Orchard 44, 84, 159, 207, 251, 312	
November, Farm and Garden Notes for 208	

O.

October, Farm and Garden Notes for ...	159
October, Orchard Notes for	159
Oil, Growing Mint for	200
One-Farm Exhibits at the Exhibition, 1920	107
Opossums, Trapping	38
Orchard	23, 237, 278
Orchard Notes	44, 84, 159, 207
Orchard Notes for July	281
August	44
September	83
October	159
November	207
December	251
Ornithology	4, 74

P.

Paper Money, First Issue of	201
Pastoral	60, 127, 131, 171, 222, 259
Penning Sheep, Device for	60
Perennial Cotton, Productivity of	49, 78
Pestilent Weed	141
Pests, Eradicating	25
Pig-fattening Experiments with Dried Blood	307
Pig-raising, Profits on	173
Pigs, Feeding, on Dried Blood	223
Pigs, Great Average Price for	173
Pineapple Growing	25
Pisé Buildings for Farmer	213
Plant Pathology	297
Plant Seeds, Fertilising before Sowing	9
Plantation Futures	222
Poisoning White Ants	76
Potato, A New Immune	7
Potatoes, Irish Blight in	57, 69
Poultry Farming, A Family's Experi- ence in	276

	Page.
Poultry	18, 66, 123, 174, 224, 268
Poultry Conference, Queensland Agricul- tural College	228
Prevention of Corns in Horses	130
Pure-bred Stock, Breeders of	127, 259
Premature Arrowing of Sugar-cane	279
Prevention of Irish Blight	57, 69
Prices of Farm Produce in the Brisbane Markets	40, 80, 156, 204, 248, 310
Prices of Fruit in the Southern Markets	41, 81, 157, 205, 249, 311
Prices of Fruit in the Turbot Street Markets	41, 81, 157, 205, 249, 311
Prices of Stock, June Record	173
Prices of Vegetables in the Brisbane Markets	40, 80, 156, 204, 248, 310
Prickly-pear, Eradication of	73
Prickly Poppy	293
Productivity of Perennial Cotton Plants	49, 78
Profits in Pig-raising	

Q.

Queensland Agricultural College Egg- laying Competition 18, 66, 131, 174, 224	
Queensland Agricultural College, Final Report of Egg-laying Competition, 1920	18, 66, 131, 174, 224, 268
Queensland, Coffee-growing in	191, 280
Queensland, Sugar Crop of 1920	

R.

Rainfall in the Agricultural Districts 48, 88, 161, 203, 256, 296	
Rapid Earth Borer	59
Rats in Sugar-cane	27
Record Lambing	264
Record Prices for Stock	173
Red and Black Ants, To Destroy	77
Remarkable Rubber Discovery	200
Report on Fruitgrowing and Irrigation Methods in California	23
Rice-growing	184
Road-making, Up-to-date	78
Root Disease of Cocoa	241
Root Disease of the Banana	297
Roup in Fowls	155
Rubber Discovery, A Remarkable	

S.

Sales, Enoggera 41, 81, 157, 205, 249, 311	
Science	73
Seeds, Fertilising before Planting	209
Seeds, Testing	209, 253, 315
September, Farm and Garden Notes for	83
Sheep on Coastal Lands	171
Sheep-penning Device	60
Sheepskins, Tanning	77
Shortage of Cotton	11
Short and Long Stapled Cotton	52
Shorthorns	1
Silage Stack, Contents of a	155
Silage, Sunflower	103
Silage: What it is and How to Feed it	93
Silver Wattle Gum	305
Sisal Fibre Industry	144
Sisal Hemp	261
Societies, Show Dates, &c. 39, 78, 153, 200, 247	
Some Champion American Dairy Cows	261

	Page.
Some Phases of the Cultivation of Sweet Peas	138
Some Record Prices of Stock	173, 212
Sorrel, Eradication of	295
Specification for Laying a Concrete Floor for Cow Bails	267
Southern Fruit Markets 41, 81, 157, 205,	249
Spacing of Cotton	183
Special Interstate Fruit Train	242
Stock, Record Prices for	173, 212
Suffolk Punch in England	236
Suffolk Punch, War Record of the	63
Sugar and Alcohol from the Nipah Palm	202
Sugar-cane Planting in the North	142
Sugar-cane, Premature Arrowing of	279
Sugar-cane, Rats in	27
Sugar Crop for 1920	182
Sugar District, The Maroochy	27
Sugar Mills in the Early Days of Queensland	285
Sugar Plantations, The Northern	181
Sundial, The Construction of a	201
Sunflower Silage	103, 212
Sunrise and Sunset in Queensland 46, 86, 162, 216, 254, 316	
Sweet Peas, Some Phases of the Cultivation of	138

T.

Taking Water Out of Fruit	223, 278
Tanning Hides	195
Tanning Hog Skins	38
Tanning Sheepskins	77
Testing Seeds	209, 253
The Algaroba or Mesquit Bean	8
The Canadian Province of Alberta	217
The Chinese Langshan Fowl	136
The Central Sugar Districts	281
The Cotton-growing Industry	53
The Cotton Industry in America	6
The Early Sugar Mills of Queensland	
The Eradication of Prickly-pear	73
The Maroochy Sugar District	27
The Northern Sugar Plantations	181
The Pink Boll Worm of Cotton	
The Production of Mint for Oil	200
The Suffolk Punch	63, 236
The White Cedar	146

	Page.
The White Wax Scale, Experiments in the Destruction of	238
The World's Wheat	301
Times of Sunrise and Sunset, Brisbane 46, 86, 162, 216, 254, 316	
To Construct a Sundial	201
To Get Rid of Warts on Cattle	155
To Glaze a Cement Barrel	238
To Prevent Irish Blight in Potatoes	69
Tractor, The Fordson	10
Trapping Opossums	38
Tropical Industries 27, 142, 181, 239, 279	
Two Species of Kurrajong Occurring in Queensland	289

U.

Use of Bluestone on Blown Sheep	309
Up-to-date Road Machinery	78

V.

Valedictory	1
Variation in Coconuts	144
Variation in the Bark of Two Common Eucalypti	70
Vegetables, Prices of in the Turbot Street Markets	40, 80, 156, 204

W.

War on Fruit-eating Birds and Rats	153
War Record of the Suffolk Punch	63
Watch as a Compass	154
Water-finding	82
Wattle (Silver) Gum	
Weed, A Pestilent	141
Weeds of Queensland, Notes on the 196, 243	
Wheat Prices Fixed	278
Wheat, The World's	301
White Ants, Poisoning	76
White Cedar	70
White Wax Scale, Eradication of	238
Woongarra District, Irrigation of the 56, 103	

INDEX TO ILLUSTRATIONS.

	Page.		Page.
The Fordson Tractor	10	Economical Exhibit	120
Needle Burr	31	Cattle Parade	121
Cotton Injured by Exposure to Rain ...	55	A Watch as a Compass	154
Sheep-penning Device	60	Harvesting Rice	187
Barks of Eucalypti	70-72	Head of Rice and Hulled Rice ...	189
Nitrogen Nodules of the Sword Bean ...	79	Onion Weed	197
H.R.H. the Prince of Wales in the Show Ring, National Association Exhibition, 1920	94	Construction of a Sundial	201, 202
Central Features, Department of Agri- culture and Stock at the National Association's Exhibition, Bowen Park, 1920	95	Burr Buttercup	244
Wool Exhibit	100	Major A. J. Boyd's Sugar Mill and Boiling House, "Ormeau," Pimpama, 1869	286
Sisal Trophy and Cotton Exhibits ...	101	The House and Garden and Cane Nursery	286
Cereals and Grains at the Exhibition ...	105	Ground Plan of Battery House ...	287, 288
Pure Seeds Exhibit	106	Common Kurrajong	290
Native Grasses, Sugar-cane, &c. ...	109, 110	North Australian Kurrajong	292
Sugar-cane Varieties at the Exhibition	116	The Root Disease of the Banana in North Queensland	298-300

Queensland.

Department of Agriculture and Stock.

Volume XIV.



JULY, 1920.

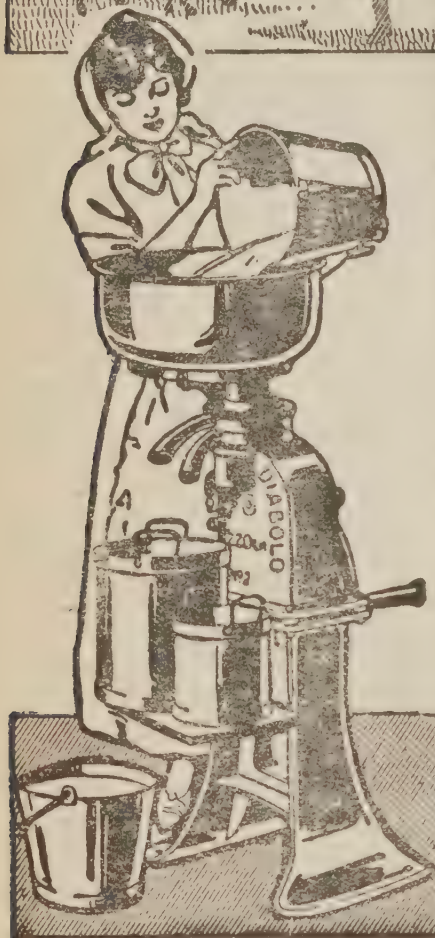
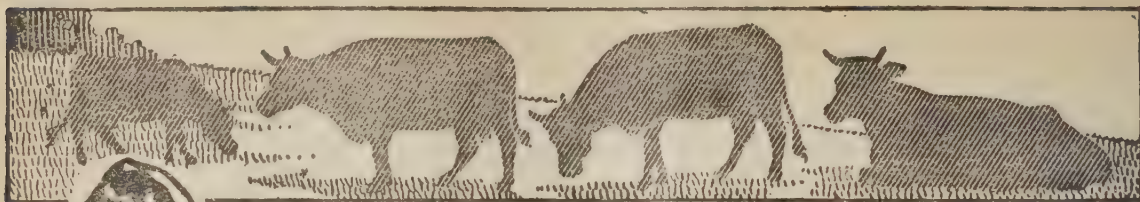
Queensland Agricultural Journal.



REGISTERED AT THE GENERAL POST OFFICE, BRISBANE,
FOR TRANSMISSION BY POST AS A NEWSPAPER.

Edited by
A. J. BOYD, F.R.G.S.Q.

Are YOU wasting Cream?



THOUSANDS OF GALLONS of valuable butter-fat are wasted in Australia every year owing to inferior separating. There is enough money lost every year to buy a new "Diabolo Separator" for every dairy farmer in Queensland. The "Diabolo" is the world-wide favourite. It is made of the finest materials, it runs smoothly, is easy to turn, and wonderfully easy to clean. It will pay for itself over and over again. Back up your cows by using a "Diabolo." Have one on 30 days' Free Trial and watch results. Easy to buy—Cash or Terms.

Write to us to-day.

DIABOLO
CREAM SEPARATOR CO.
138-140 CREEK ST BRISBANE

Make YOUR Farm Show a Good Profit This Season!

The First Thing to do in order to achieve this result is—

To Plant Taylor's Seeds

After that it depends upon the weather, etc. But if you plant poor Seed at first, you won't have such a splendid crop as you would if you had planted the best germinating Seed. *Taylor's Seeds are always reliable.*

Recleaned Broad Leaf Hunter River Lucerne Seed

We have just received direct from the Hunter River district of New South Wales a stock of the abovementioned seed. We stock no other variety whatever. Lucerne Seed is going to be scarce and dear, and our advice to you is to ORDER NOW if you are thinking of planting now or a little later. Do not delay, or wait until stocks run out. *Order now.*

Fodder Seeds of all Kinds

You can now sow all kinds of fodder crop Seeds, and we mention a few lines of which we have good stocks—Imphee, Ordinary Panicum, White Panicum, Japanese Millet, Sudan Grass, etc. Also Rhodes Grass and Paspalum Seed.

Oats and Barley

Oats and Barley may both be sown this month. We have just landed into our store a fine lot of recleaned Algerian Seed Oats. Also Cape Barley. Both of these lines are going out freely. Prices on application.

Vegetable and Flower Seeds

of every description. Flower Seeds in packets at from 3d. each upwards, also in bulk. Just arrived from Great Britain and America our new stock of Vegetable seeds of all kinds. *Order your's from*

Chas. Taylor & Co., "The Leading Seedsmen"
110-116 Roma St., Brisbane

VOL. XIV., PART 1.]

[JULY, 1920.

Registered at the General Post Office for Transmission by Post as a Newspaper.]



THE
QUEENSLAND AGRICULTURAL JOURNAL,

ISSUED BY DIRECTION OF

THE HON. THE SECRETARY FOR AGRICULTURE.

EDITED BY A. J. BOYD F.R.G.S.Q.

VOL. XIV. PART 1.

JULY.

By Authority:

ANTHONY JAMES CUMMING, GOVERNMENT PRINTER, BRISBANE

1920.

We are Bag Specialists

For Farmers For Farmers For Farmers

Bags for Wheat, Maize, Chaff, Peas, Beans, etc.
Any sort or kind. New or Second Hand.

**For Storekeepers, Meat Exporters, Flour
———Millers, Bacon Curers, etc.———**

All kinds of HESSIAN and CALICO BAGS
———Printed to your own design.———

For Packing, Signwriting, Plastering, etc.
HESSIAN & CALICO all widths & grades.

Joyce Bros. (Q.) Limited,
Stanley Street, South Brisbane.

Sowing the Right Kind of Seed

H. A. PETERSEN Ltd. supply seed that *is* good. They exercise every precaution to guard against impurities, therefore it is the *right* kind of seed to sow.

SEED POTATOES.—Brownell's, Up-to-date, Manisty, Excelsior Blues, Early Carmen. Especially good. Price on application.

LUCERNE—Best Hunter River, broad leaf, double screened. Price 3/- lb. Special quote for large quantities.

OATS—Splendid seed. Price, 9/6 bushel.

BARLEY—Extra Special. Price, 10/- bushel.

RYE—Extra special. 17/6 bushel.

TARES—Excellent sample. 32/6 bushel.

MANCOLD WURZELS—Price, 6/- lb.

SWEDES—Price, 6/- lb.

RHUBARB ROOTS—1/- each, 10/- doz. Carriage extra.

COUCH GRASS—Price on application.

SEED WHEAT—Price on application.

SEED BARLEY—Price on application.

**H. A. Petersen
Ltd.,**

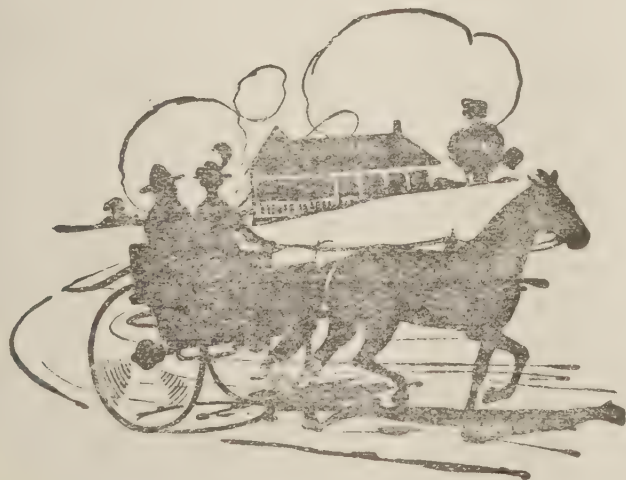
*Agricultural
Seedsmen,*

George Street, BRISBANE;
Also at 244 Queen Street.



CONTENTS.

	PAGE.		PAGE.
VALEDICTORY	1	ARMSTRONG-WHITWORTH AND CIVIL ENGINEERING	29
AGRICULTURE—		BOTANY—	
Cotton-growing	1	Illustrated Notes on the Weeds of Queensland (C. T. White, F.L.S.)	30
The Cotton Industry in America ...	6	ALGARROBA SEED	30
A New Immune Potato: Arran Victory	7	SCIENCE—	
The Algaroba or Mesquit Bean ...	8	Water-finding	32
Successful Experiments in Fertilising Seeds before Sowing	9	ENTOMOLOGY—	
The Fordson Tractor	10	Cane Grub Investigations	35
Cotton Shortage	11	<i>Doticus</i> sp. (<i>D. pestilens</i> ?) attacking Granadillas in Queensland (E. Jarvis)	36
The Cotton-growing Industry ...	11	GENERAL NOTES—	
Cotton-growing	12	Trapping of Opossums	38
Neglected Industries—		Tanning Hog Skins	38
Tobacco	12	Societies, Show Dates, &c.	39
DAIRYING—		London Quotations	39
Characteristics of Dairy Cows ...	17	THE MARKETS—	
POULTRY—		Prices of Farm Produce in the Brisbane Markets for June, 1920	40
Report on Egg-laying Competition, Queensland Agricultural College, May, 1920	18	Vegetables—Turbot Street Markets...	40
Chicken-pox or Warts (D. Wallace)...	20	Southern Fruit Markets	41
More about Chicken-pox	22	Prices of Fruit—Turbot Street Markets	41
THE ORCHARD—		Top Prices, Enoggera Yards, May, 1920	41
Fruit-growing and Irrigation Methods in California (Hon. J. M. Hunter)	23	FARM AND GARDEN NOTES FOR AUGUST ...	43
Eradicating Fruit Pests	25	ORCHARD NOTES FOR AUGUST	44
Pineapple-growing	25	ASTRONOMICAL DATA FOR QUEENSLAND ...	46
Lisbon Lemons Grown at Moorooka (F. E. Friend)	26	RAINFALL IN THE AGRICULTURAL DISTRICTS	48
THE HOME GARDEN	26	DEPARTMENTAL ANNOUNCEMENTS ...	XVII.
TROPICAL INDUSTRIES—			
The Maroochy Sugar District ...	27		
Rats in Sugar-cane	27		



You paint a house to protect as well as to beautify it—be sure to use a paint that will withstand the elements. A guarantee as to lasting quality goes with every can of

**Berger's
Paint**  (Prepared)

James Campbell & Sons Ltd.
Creek Street, Brisbane,
Distributors for Queensland.

Sold by local agents in most towns

OVERCOAT WEATHER

—and the House of PIKE BROTHERS is splendidly ready to supply OVERCOATS that are full of good new style and superb quality. —

Dark Grey Tweed overcoats, Raglan Sleeves, fashionably made with loose belt right round.

Price, **80/-**

Same quality and shape, but without belt.

Price, **77/6**

Better qualities, and superb qualities at that.

Price, **5, 6, & 7 guineas.**



—and now for these very warm

Coat Sweaters

All-wool coat sweaters, Brown and Grey shades, showing "V" front or button to throat with collar. Sizes, 34 to 44. Exceptional Values.

22/6 to 50/-

Carriage is Paid.

PIKE
BRISBANE

BROTHERS
LIMITED

TOWNSVILLE
TOOWOOMBA

QUEENSLAND AGRICULTURAL JOURNAL

VOL. XIV.

JULY, 1920.

PART 1.

VALEDICTORY.

With this issue of the "Queensland Agricultural Journal" our connection with it as Editor from its first issue, twenty-three years ago, now ceases. We wish our readers farewell, and especially recognise our indebtedness to all of them who have liberally contributed to its pages valuable articles on numerous phases of the agricultural and allied industries of Queensland, and do not doubt that their interest in the Journal will receive a favourable impulse under the new conditions.

A. J. BOYD.

Agriculture.

COTTON-GROWING.

In view of the probability of the recrudescence of the cotton-growing industry in Queensland, it is advisable that intending growers should be carefully instructed in all that concerns the preparation of the land; the best varieties of cotton to grow in the various districts and varying climates of this extensive State; and the best system of planting, cultivating, picking, and marketing the crop.

In 1911 the Queensland Department of Agriculture published an exhaustive treatise on the industry by a former practical cotton-grower and ginnery-owner in the East Moreton district. This pamphlet has reached its sixth edition, and has undoubtedly proved of great service to growers since its first issue.

It is, however, advantageous to Queensland growers to study the methods adopted in the United States of America, whence comes the major portion of the world's production of the textile.

It should be noted that little, if any, disease of the cotton plant or boll has made its appearance in Queensland. At rare intervals a kind of boll worm attacked the green bolls; but no such devastation has taken place anywhere in the world probably as that caused by the Pink Boll Worm and the Weevil in the cotton-growing States of America—owing to whose ravages whole districts have been thrown out of cultivation, and others are still being threatened by the boll worm—on all the plantations. That cotton is a good drought-resisting plant is undoubted, for we have seen in the Central Western district, 500 miles from the eastern coast, fine cotton plants which were growing luxuriantly throughout the protracted drought which terminated in 1902. For two or three years these plants had been unacquainted with visible water in any form; but it does not follow from this that cotton can always be successfully produced on a commercial scale in an arid wilderness, for long-continued dry weather has an injurious effect on the crop, in that it checks the

production and growth of the bolls, and is the cause of the fibre being too short to realise the best price in the world's markets.

Mr. D. Jones, cotton expert, in a communication to a Brisbane daily paper in May last, stated that at Boonah he saw a small cotton plot which had yielded £20 worth of cotton to the acre. On the other side of the fence the farmer was burning off a maize crop which had failed from lack of rain.

Now turn to the State of Arizona, U.S.A., where two varieties of cotton are grown—the Pima or American Egyptian, and the short-staple varieties, of which Mebane's Triumph is the most important at present.

We have received from the University of Arizona College of Agriculture an excellent pamphlet on cotton-growing in that State by G. E. Thompson and C. J. Wood, in which the seed and the land and its preparation are first considered as follows:—

The discussions of this bulletin refer primarily to American Egyptian cotton. At the end of the bulletin those particulars in which short-staple cotton differs from long-staple are given special mention.

SEED.

Great pains to secure the best possible seed should be exercised by all who grow cotton. Seed of an inferior strain will result in a decreased yield and a poor quality of fibre. It is advisable for farmers to buy seed for planting purposes from responsible cotton-growers' associations. At least one of these associations at the present time (and others are preparing to do the same) make it a business through their cotton experts to produce and sell high-quality seed to members of the association. One of the associations now maintains, and the other associations should maintain, a separate gin for handling this cotton. Cotton seed that goes through the regular commercial gins is certain to be mixed more or less with inferior seed, and its use will in time result in decreased yields.

Those who have the time and who are especially interested in cotton-breeding may find it worth while to grow a separate small field of cotton from which seed is selected for the following year's planting. On this special field great care should be taken to rogue out and destroy all plants of undesirable or inferior type and all plants that fail to produce a reasonable number of matured bolls. In addition to this general precaution, the fibre itself should be examined; and if any of the plants have produced fibre that is short and weak, they should be discarded. The seed that is to be used for planting purposes should be fully matured before the first freeze of consequence in the fall. Because early setting and maturing of bolls is very desirable in American Egyptian cotton, it is advisable to select seed from plants that show this character.

The average farmer in Arizona uses 25 lb. to 35 lb. of seed per acre when planting cotton. Although one-half of this amount will give a sufficient stand if seed is good and soil and weather conditions are ideal, still it is advisable to use the amount indicated and later thin to the proper stand.

LAND ADAPTED TO GROWING COTTON.

A rich sandy loam soil, well supplied with humus, is ideal for the growing of cotton. Very light sandy soils, as a rule, do not produce heavy crops of cotton. Heavy clay soils are unsatisfactory because of the trouble experienced in securing a good stand, and because of the difficulty of irrigating properly. However, with good care, cotton can be produced upon practically any soil that is suitable for general farming.

PREPARATION OF LAND FOR PLANTING.

Thorough preparation of the land for cotton pays, and pays well. Cotton is a cash crop. A good quality of clean, strong fibre brings a better price than fibre that is weak, dirty, or inferior for any other reason. Well-prepared land will produce more fibre, longer fibre, and stronger fibre than poorly prepared land. Cotton from a field that produces a heavy crop is easier to pick and keep clean and free from dirt and trash than cotton with small, poorly opened bolls. If land is to be properly prepared for cotton, the preparation should begin several months before the planting season. Coarse trash or other material on the ground must be chopped fine and ploughed under or otherwise put in such shape that it will not interfere with the cultivation of the cotton plants. The ground should be ploughed rather deep (7 in. to 8 in.) as early as possible, and allowed to weather till planting time. From five to ten days before planting, the ground should be thoroughly irrigated. This time should be just sufficient to allow the ground to dry out properly and be worked to a good seed-bed. Many farmers make a mistake in the preparation of their cotton land by not having sufficient moisture in the ground before planting. Water should be held on the land long enough to ensure its being wet to a depth of 4 ft. to 5 ft. Land left rough after ploughing takes water better than land that has been disked and harrowed to a smooth surface. Land that has been irrigated when rough, particularly if it is of a heavy clay type, should be harrowed with a spike-tooth

harrow as soon as dry enough to permit of this treatment. This harrowing will save considerable moisture, knock off the tops of large clods, and fill the small depressions. The disk, followed by the spike-tooth harrow when necessary, can be used to work up a satisfactory seed-bed. An ideal seed-bed consists of about $2\frac{1}{2}$ in. of finely mulched surface soil with a firm and moist soil beneath. It is not advisable to plant cotton and "irrigate it up" because of the difficulty often encountered with the baking of the ground over the sprouting cotton seeds.

PLANTING.

The time of planting cotton will vary somewhat with the kind of soil and with the locality of the State in which the planting is made. Recommendations differ greatly in this regard, but the consensus of opinion of the practical cotton-growers is that the best time for planting in an average season is during the last ten days of March and the first ten days of April [early spring]. Farmers handling sandy types of soil can plant one to two weeks earlier than those handling heavy or clay types of soil. It pays to plant as soon as the ground is sufficiently warm to ensure good germination and thrifty plants. Early plantings when the ground is cold often result in a thin stand and weakened plants; likewise early planting in cold ground, particularly if the days are warm and the nights cold, favours the development of the disease called "sore shin." Late plantings do not allow sufficient time for the plants to set and mature a large crop. The sooner the cotton can be planted after the ground is well warmed and danger of frost is past, the better the average results that will be secured. Cotton should be planted as shallow as possible and still get the seed deep enough into moist ground to ensure good germination.

THINNING.

The thinning of cotton is a question on which the best cotton-growers hold widely differing opinions. We believe that the distance to which cotton plants are to be thinned should be governed largely by the soil. Heavy, rich land will stand thick plantings of cotton. Thin, light land should have cotton spaced relatively far apart. This thin planting, however, should not be carried to such an extreme that the land will not be utilised to its full capacity to produce. With heavy rich ground some cotton-growers prefer that the plants be from 6 in. to 10 in. apart. A few growers will prefer even less space than this. The average cotton-grower with typical cotton land of the Salt River Valley will space his cotton from 12 in. to 18 in. apart in the row, with rows $3\frac{1}{2}$ ft. apart. On thin poor land it may be advisable to increase the spacing to 24 in. or 30 in. The purpose of thinning cotton is so to space the plants that they may have light, air, moisture, and plant food in such proportions that they will produce the maximum number of matured bolls per acre. Cotton given too much space is very likely to produce a large, coarse plant, from which the branches may be broken in the fall by heavy winds. Cotton given a reasonable spacing can stand more drying or more severe conditions and still recover than cotton closely spaced. American Egyptian long-staple cotton should be thinned on the sandy light soils when the plants are from 4 in. to 8 in. high, and on the heavy rich soils when the plants are from 8 in. to 12 in. high. On the extremely rich soils thinning can be delayed till the plants are 14 in. to 16 in. high.

Time of thinning has a great deal to do with the control of vegetative branches. The development of vegetative branches is undesirable in American Egyptian cotton. Early thinning encourages their development; while late thinning discourages their development.

CULTIVATION.

The cultivation of cotton should begin as soon as the plants are through the ground well enough to mark the row, and be continued every ten to fifteen days till the plants are too large to permit the use of a regular cultivator. Sometimes the cultivation can be continued by the use of a one-horse cultivator, especially in the wider spaced rows and on heavy soils that tend to bake. Early cultivation checks evaporation, warms the soil, and will kill weeds and grass at the stage at which they are most easily destroyed. It will also eliminate much hand work or hoeing. For the most part the early cultivations may be comparatively deep and reasonably close to the plant. Late cultivations must be shallow, in order to avoid cutting and breaking numerous cotton roots.

IRRIGATION OF COTTON.

The proper irrigation of cotton is the most important single item in the profitable growing of the crop. Even though all other conditions are right, if the irrigation is wrong the yields will not be satisfactory. Over-irrigation stimulates plant growth, and to a certain extent prevents the forming of cotton squares and the setting of bolls; while light irrigation encourages the setting of fruit and the dwarfing of the plant, which are highly desirable especially in the earlier stages of growth of American Egyptian cotton. However, this dwarfing of the plant is neither necessary nor desirable on light desert soils deficient in both nitrogen and humus. When a plentiful supply of water is suddenly applied, following a period when the plant has been

suffering for water, it will cause a quick stimulation of growth, and the plant will shed or drop much of the young fruit already set. It is best to withhold irrigation after planting as long as possible and still keep the plants in a growing condition. Cotton will not be injured by wilting slightly in the middle of the day, provided it fully recovers its fresh appearance by late afternoon or early evening, and provided there is enough moisture deep in the soil to encourage deep root penetration. As long as there is sufficient moisture in the ground to permit transpiration to maintain the leaves in a cool condition during the heat of the day, the plant is not suffering, but when the leaf feels warm to the hand irrigation must be immediately supplied. After cotton begins to bloom, the moisture supply should be kept as uniform as possible. Cotton should be kept growing steadily, but excessive growth should be prevented. If examination during the blooming stages shows that the vegetative growth has practically stopped and the cotton is blooming to the top of the plant, water has been withheld too long. In other words, the terminal bud should be kept growing slightly in the lead of the flowers on the fruiting branches.

Prior to fruiting, the desirable method is to give as little water as possible, forcing roots to penetrate deeply for soil moisture stored prior to planting. The system changes after the fruiting begins, and the purpose then is to maintain a thrifty and uniform though not rank growth.

PICKING.

In Arizona, cotton-picking is usually begun during the last half of September [autumn]. It does not pay to begin picking until sufficient cotton is open to allow the gathering of 500 lb. to 700 lb. of seed cotton per acre at the first picking. In nearly all cases it will be advisable to pick the fields two or three times before the gathering of the crop is complete. Care should be taken in picking to see that no dirt, leaves, sticks, or other trash get mixed with the fibre. It is extremely difficult to separate the dirt from the fibre in a roller gin, and dirty cotton always brings a low price. With short-staple cotton, leaves and other trash can be separated to a considerable extent. Saw gins are used with short-staple cotton.

VOLUNTEERING OR RATOONING.

The volunteering or ratooning of cotton for two or three years in succession from the same planting was practised in Egypt a good many years ago, but has been abandoned there. It has been tried in this State with varying results. The practice is to be condemned for several reasons. In many seasons the volunteer stand of cotton is insufficient to produce a maximum yield. Usually the fibre produced from volunteer cotton is shorter and weaker than the fibre produced from cotton planted each year. In addition to these difficulties, the practice of volunteering cotton favours the increase of injurious insect pests and the development of troublesome cotton diseases. The practice has much to condemn it and very little to favour it. It is only under the most extreme or unusual conditions that the volunteering of cotton will pay.

TOPPING.

The topping of cotton, or the pinching or cutting off the terminal buds, has been advocated and practised by many as a means of preventing excessive plant growth and as a means of stimulating the formation of bolls. The results secured from this practice have been conflicting. In some cases, particularly on heavy rich ground, reports state that the practice has been profitable. Up to the present time no reports have been received showing that the practice is profitable on medium or thin lands. Properly grown cotton plants should not require topping. Uncontrollable conditions, such as a high water table or excessive rains, may make topping desirable. If topping is to be practised at all, it is recommended that it be delayed until about the middle of August. Early topping, instead of checking plant growth, may stimulate the production of vegetative branches if growing conditions are favourable, while late topping ought to further the development of bolls already set [summer].

FERTILISING COTTON.

Considerable interest has developed in the last two years in the fertilising of cotton. For the most part the desert soils in Arizona are deficient in nitrogen, and it is possible that on such soils nitrogen fertilisers may prove beneficial. Experience indicates that desert land that has been ploughed and irrigated a number of times, and brought into a condition of good tilth, will produce better cotton than similar land that has received but little cultivation. This is shown by the fact that the second crop of cotton on desert soil is often better than the first crop. On old lands that have grown legumes for a number of years, if any fertiliser proves profitable, it will be one containing phosphorus. Nitrogen fertilisers probably will not pay on such lands. It is not advised that farmers buy phosphorus fertilisers or any other fertilisers on an extensive scale until they have first tried them on small plots in their own fields. Applications of 200 lb. to 500 lb. of acid phosphate per acre, at the time the cotton is planted, promise to give beneficial results; yet several farmers

who have made small tests failed to note appreciable benefits, and tests on the Salt River Valley Experiment Station have so far failed to give increases in yield.

During the last year many questions have been asked regarding the advisability of planting cowpeas in the growing cotton for the purpose of increasing the available nitrogen. This recommendation has usually been to the effect that the cowpeas should be planted about thirty days after the cotton is planted, and then destroyed about the time the cowpeas are coming into full bloom. A more practical method is to plant the cowpeas at the time the cotton is planted, as this avoids the necessity of special irrigation to bring up the cowpeas. It is claimed that the planting of cowpeas in this way has a beneficial effect upon the growing cotton. In handling the cowpeas in this manner, it has been customary to plant two rows of cotton and the third row of cowpeas. We do not have accurate or conclusive information regarding the benefit of planting cowpeas with cotton. There is considerable evidence to prove that a legume crop may have beneficial effects upon a companion crop, but whether it will pay in the case of cotton remains to be proven. If cotton is planted in this manner, it should be considered an experiment, and an accurate comparison should be made with the common methods of planting.

ANGULAR LEAF SPOT.

Fortunately there are not many cotton diseases of serious consequence in Arizona at the present time. Probably the disease that has caused heaviest losses is one that farmers have observed but little, even though it may be present to a considerable degree. This is a disease called Angular Leaf Spot or Black Arm Disease of cotton. This disease attacks the plant in all stages of its growth, appearing on the younger plants as small dark angular spots on the leaves. Later the disease attacks the stems and fruit, showing as darkened, shrunk spots. Control measures are still in the experimental stage; but there is evidence that control, at least in the seedling stage, can be effected by careful treatment of the seed before planting. If treatment of seed to control this disease is attempted, the following is recommended:—

Bichloride of Mercury Treatment for Angular Leaf Spot.

Dissolve 1 oz. of bichloride of mercury in a small quantity of hot water; then mix into 7½ gallons of water. Dip the seed into this solution, stirring to make sure that it is thoroughly wet and allow to soak for one hour. Spread the seed out and dry thoroughly before putting into sacks.

Do not dip more than three lots of seed into the same solution, as each lot of seed weakens the solution.

Bichloride of mercury is a poison, and the solution should be destroyed, in order that people or animals may not drink it by mistake.

Bichloride of mercury corrodes metal, and solutions of it must not be placed in metal utensils. Wooden or earthenware vessels should be used.

COTTON ANTHRACNOSE.

Cotton Anthracnose is a disease that has caused great loss in the south, but little if any in Arizona. Importation of cotton seed should be avoided, as this disease is carried on or within the seeds. No satisfactory methods of controlling this disease are known.

ROOT ROT.

Root rot of cotton is a disease, and lives over in the ground from year to year. The only practical known method of control on infected soil is to grow for at least two years in succession some crop not affected by root rot. Such crops are corn, the various varieties of sorghum, and the small grains, such as wheat, barley, &c. Alfalfa [lucerne] and certain other tap-rooted plants are subject to root rot, and must not be grown when attempting to rid the ground of this disease. Since certain weeds may be affected by root rot, deep ploughing and clean cultivation are recommended as control measures.

INSECT PESTS.

Due largely to the strict quarantine that has been maintained, cotton boll weevil, pink boll worms, and many other troublesome insect pests of cotton have been kept out of Arizona.

COTTON IN ARIZONA AGRICULTURE.

At the present time [1919] cotton is the most important cash crop in Arizona. It is unlikely that the present high price of cotton will be maintained indefinitely; and farmers should bear in mind that any system of agriculture that is to be permanently successful must be well balanced. Cotton should not be grown to such an extent that other crops or live stock are reduced below a safe amount or number. It should be the aim of every good farmer to maintain the soil at all times in a high state of fertility, and to this end an intelligently planned crop rotation must be followed.

SHORT-STAPLE COTTON.

Short-staple cotton will mature in a shorter growing season than American Egyptian cotton, and therefore can be grown further north and at higher elevations. The soil requirements and the preparation of the seed-bed should be the same for the two classes of cotton.

Because of its shorter growing season, short-staple cotton can be planted one to three weeks later than American Egyptian. A smaller amount of seed is required per acre—15 lb. to 25 lb. being sufficient.

The thinning of short-staple cotton should be done when the plants are 4 in. to 6 in. high, and the plants are usually spaced from 16 in. to 24 in. in the row, with rows $3\frac{1}{2}$ ft. apart. With very rich soils, both the spacing between the plants in the row and the distance between rows are increased.

The general principles applying to the irrigation and cultivation of American Egyptian cotton apply to short-staple cotton.

SUMMARY.

In growing cotton, good seed is extremely important.

A rich sandy loam soil, well supplied with humus, is ideal.

Early deep ploughing and thorough preparation of the land are necessary.

The seed-bed should be wet to a depth of 4 ft. to 5 ft.

Plant early, but not until the ground is sufficiently warm to ensure good germination and thrifty plants.

The character of the land should govern the rate of thinning.

Cultivation should begin as soon as the plants are through the ground well enough to mark the row.

Proper irrigation is the most important single item in the growing of cotton.

After planting, withhold irrigation as long as possible.

Prevent excessive growth.

The terminal bud should be kept growing slightly in the lead of the flowers on the fruiting branches.

In picking, keep the cotton clean.

Volunteering cotton does not pay.

Report trouble with disease or insect pests to the Agricultural Experiment Station, or the State Entomologist.

Do not allow the soil to become depleted; practise crop rotation; maintain a balanced agriculture.

THE COTTON INDUSTRY IN AMERICA.

THE PINK BOLL WORM.

The cotton-growers in America are, according to an article published in "The Weekly News Letter," issued by the United States Department of Agriculture in March last, threatened with wide-spread losses, through the medium of the Pink Boll Worm, owing primarily to the distribution of seed from newly-found, hitherto unsuspected, areas in Louisiana; and it is stated that, unless radical steps are taken promptly to destroy it, the worst known pest of cotton will get out of hand. Following is the article in the "News Letter":—

"The Pink Boll Worm of cotton, previously supposed to exist in this country only in Texas, has been discovered at a number of places in Cameron Parish, La., where it is believed to have been for at least two years. It has been found also in Calcasieu Parish, but so recently that definite information as to distribution is not available. The old infested area around Trinity Bay has also been somewhat extended. Lots of cotton seed, ranging from 1 to 20 ears, have been shipped from Cameron Parish to Alexandria, Broussard, Shreveport, Bunkie, and Monroe, La.; and San Antonio, Fort Worth, Houston, San Marcos, and New Braunfels, Tex. Several of these points have no oil mills, and the seed was probably used for planting. Thus there is the possibility that the Pink Boll Worm has been scattered to all of these sections and possibly to others not yet determined.

"This brings about a serious situation for the cotton industry of the United States (says the United States Department of Agriculture). Unless the radical but necessary steps are promptly taken by the States concerned in co-operation with

the Federal Department of Agriculture, the Pink Boll Worm will certainly get out of hand and the work of extermination already carried out in Texas will be lost. Congress has been asked to provide additional funds and to make them immediately available.

“CONFERENCE TO PLAN WORK.

“A conference was held in New Orleans on 5th March, which was attended by representatives of all the cotton States and of the Department of Agriculture. The conference was called by Governor Pleasant, of Louisiana, in co-operation with Governor-elect Parker, who is president of the American Cotton Association. The purpose was to consider the whole situation as it has now developed, and to secure the taking of necessary steps by Texas and Louisiana and any other States concerned to meet the emergency.

“The newly discovered infestations in Cameron and Calcasieu Parishes, La., and Orange County, Tex., are along the lower course of the Sabine River, near the Gulf of Mexico. In addition, there is some reinfestation of the old Trinity Bay area in Texas, but the work of recleaning that area has almost been completed. The work, however, has consumed practically all the money that the United States Department of Agriculture had available for Pink Boll Worm eradication. Reinfestation around Trinity Bay was due to a modification of the policy originally agreed upon by the Department and State authorities of allowing no cotton to be grown in infested areas for a period of two or three years. A revision of the State Pink Boll Worm Act permitted cotton to be grown, under restrictions, in the Trinity Bay area during 1919. The reinfestation which has resulted from such growth of cotton is scattered pretty well over the old district, but the actual points of infestation are very few as compared with 1917, and the amount of infestation in the fields where the insect has been found is insignificant as to numbers. The results clearly indicate (say the specialists of the Department) the possibility of extermination by the method of establishing non-cotton zones and the cleaning up of all volunteer cotton if continued for a sufficient period. It was deviation from this method that brought the reinfestation in Texas, and the Department will insist that it be strictly followed in the tremendously greater task that now confronts the country. ‘This is the only means of control,’ says the Department, ‘that gives any hope of ultimately eradicating this most destructive pest of cotton, and the success of the work must necessarily depend on the absolute co-operation of the States concerned.’

“LOUISIANA TAKES ACTION.

“Louisiana, immediately upon the discovery of the infestation in Cameron Parish, declared a drastic quarantine prohibiting the growth of cotton and providing for the destruction of existing cotton and cotton seed within a radius of 15 miles of any infested point in that State. No provision has been made, however, for compensating planters for cotton destroyed. It is absolutely necessary (the Department says) that some provision be made to reimburse the planters for losses which they must accept in the interest of the cotton industry as a whole. The payment of these losses, it is pointed out, will be very small as compared with the risk to the cotton crop should the Pink Boll Worm get beyond control.

“The possibilities of further spread, due to the shipment of presumably infested cotton and cotton seed from Cameron Parish makes it necessary that all such shipments be traced to destination, and that steps be taken to safeguard any local infestations that may have resulted.”

A NEW IMMUNE POTATO: ARRAN VICTORY.

A correspondent of the “Agriculture Gazette” (26th March), London, expressed a wish for a potato having fine shape and cropping power, resistancy to blight, and immunity to the Black Scab or Wart diseases. He mentioned instances of certain varieties having one or other of these advantages, but not any possessing the three to a marked extent. In response a correspondent of that Journal (26th March) says:—

“In the Arran Victory we have, perhaps, the nearest approach to the desired potato. The eyeholes are not deep, and the potato is easy to peel. It is an excellent cropper, and favourable reports have been given from various parts of England, Scotland, and Ireland. I have tried this variety with excellent results.

“With regard to disease, it has proved to be a strong resister of *Phytophthora infestans*, besides being certified immune to Wart disease (Black Scab). The tubers keep well, and as a late cropper for winter use this variety is eminently reliable.

"Arran Victory can be distinguished readily from other varieties, when growing, by the strength and erectness of the haulm, which has dark green leaves, and the stem inclined to be reddish in places.

"There is one factor, however, which might prejudice growers:—The skin of the tubers is dark purple. But it is becoming more generally realised that dark-coloured potatoes almost invariably possess excellent table qualities; and Arran Victory is no exception. The flesh is almost snow-white, and is floury and dry when boiled."

This brings to our recollection that in the year 1903 there was a potato boom in England, when £500 was paid for a single ton of the then new Northern Star. Then came the Evergreen, the Up-to-Date, the Sir John Llewellyn, and the Eldorado. The area usually devoted to potato culture in the United Kingdom, prior to the war, was 1,500,000 acres. It may, therefore, be easily understood that the industry is of immense importance to the country. It is perhaps not generally known to Queensland potato-growers that no variety of potatoes will flourish for longer than eight or nine years. After that time, it begins to deteriorate, and new blood is demanded. In the old country Messrs. Sutton brought out the Magnum Bonum, which was a general favourite with farmer and consumer. Then came the Red American varieties—Early Rose, &c. These all had their day, and in due course retired into oblivion, although the Early Rose is still grown in Queensland. As a matter of fact, the Northern Star first appeared in 1892, but became all the rage in 1903. So precious was this variety that, at Ham, near London, 14 cwt. of seed of this potato was planted, the crop being raised from single eyes. It was then necessary to be economical with this variety, as single tubers sold from 7s. 6d. to 10s. One Lincolnshire potato-grower paid £500 for a ton bought from the introducer (Mr. Findlay); 15 cwt. fetched £400. This lot was grown on 14 rows, with 35 plants to a row. In 1904 the London "Daily Mail" stated that at a sale of seed potatoes at Spilsby, in Lincolnshire, all existing records for extraordinary prices were eclipsed. Six tubers of the Eldorado variety, the lot weighing only 5 oz., were disposed of by auction. This little lot realised £56 3s. 6d.; and as this works out at £402.658 13s. 4d. per ton, it constitutes a world's record. One potato sold for £11; another for £10 10s.; and £9 9s. was paid for a tuber which weighed only $\frac{1}{2}$ oz. A Stone potato, named "The Sir John Franklin," after it had only been on the market a fortnight, sold at the rate of £3,000 per ton. The highest price ever obtained for potatoes in Queensland was paid in 1919, when £50 per ton was paid in the Brisbane market.

THE ALGAROBIA OR MESQUIT BEAN.

For the past twenty years, owing to the value of the Algaroba (*Prosopis juliflora*), the planting of this tree has from time been advocated by those who have had a practical acquaintance with its various uses, more especially as a food for stock. Not only is it a tree which will flourish during the driest seasons, but it gives large crops of beans of a highly fattening value, and, moreover, it remains in bearing for some considerable time. Another point in its favour is—that it supplies the food to the stock, so to speak, automatically—that is, it drops its pods as soon as ripe, thus doing away with any labour or expense in picking and feeding by hand. Some of the species only attain the shrub form; others, such as the *P. juliflora*, grow into a tree from 30 ft. to 40 ft. high. When ripe, the pods are of a buff colour, somewhat flat in shape, and from 5 in. to 8 in. long, and in appearance is not unlike a large French bean. The value of these pods lies in their being filled, between the seeds, with a sweet mealy substance which is very nutritious, and of which horses, cattle, and pigs are very fond.*

Mention of it is made by the late Mr. Lewis A. Bernays in his valuable work on "Cultural Industries," in which he pointed out the great value of this tree in times of long-continued drought. The late Baron F. v. Mueller, in his work on "Select Extra-tropical Plants," says:—"The *Prosopis* is vernacularly known as the Cashaw, Mesquit, or Algaroba Tree, a thorny shrub growing finally to a tree of 60 ft. in height, with a stem $2\frac{1}{2}$ ft. in diameter which may send its roots to a great depth, occasionally to 60 ft., to reach underground water [Professor Sergeant]." The wood is durable and of extraordinary strength and hardness, fit for select furniture particularly, assuring when polished, the appearance of mahogany. The pods are said to be adapted only to animals chewing the cud; but, as above stated, both horses and pigs thrive on them. It is on record, however, that over-feeding

* See an article on the Algaroba trees at the Kamerunga State Nursery, by G. B. Brookes Manager of the Nursery, published in this Journal in April, 1900.

on the pods has caused the death of several horses in Jamaica. The following hints regarding germination of seed and propagation of seedlings are given by Mr. Brookes:—

“In sowing the seed, a loose open soil, made up of equal parts of rich loam or vegetable matter and sand, is the best. The seeds should be only just covered, for if planted deep, especially in cold weather, they will frequently lie dormant for some considerable time. In such cases, when the soil is stirred up, the seed will readily germinate in the spring or on the approach of warm weather. This is a point which should be noted, as seeds so planted, especially in the cooler portions of the State, are frequently looked upon as unfertile if they do not speedily show signs of vitality.

“After germination, the principal thing to guard against is over-watering. Some cases have come to notice where the young seedlings have damped off, but this was in the Northern coastal districts and in hot, moist weather. In the cooler portion of the State, this need not be feared, unless obviously over-watered. There is no mistaking young seedlings, for, like many other plants of this family, they raise the seed itself aboveground, which seed remains there for some short time until the seed lobes open, the typical Algaroba leaf not making its appearance for some days subsequent to this. The young seedlings grow very long tap-roots; plants of 4 in. in height have been found to have tap-roots of fully 18 in. in length. This necessitates careful handling if transplanting is contemplated. If the seeds are not sown where the tree is to remain permanently, shallow boxes or tins, say, 6 in. in depth, filled with the compost already referred to, are preferable to ordinary garden beds. This method prevents the tap-root from going too deep, and encourages a fibrous growth of root without detriment to the plant. On transplanting seedlings in this way, care must be taken in separating the roots when entwined, which will occur if the seed has been at all thickly sown. Otherwise, the transplanting of seedlings thus propagated is much safer than that of those grown in garden beds, and, if carefully done, very few failures will result.”

SUCCESSFUL EXPERIMENTS IN FERTILISING SEEDS BEFORE SOWING.

We are indebted to “A Reader of the ‘Q.A.J.’” for the following interesting cutting from a home paper, giving an account of successful experiments, made at the scientific farms of Rothamstead (in Hertfordshire, England) and in Italy, with a new idea in treating seeds, before sowing, with the object of imparting a fertiliser to them, which they absorb, as hereafter explained. Following is the article referred to:—

The Board of Agriculture and the scientific farms at Rothamstead, in Hertfordshire, have been experimenting with a new idea of treating seeds.

One of the gravest lessons impressed on us by the war is that we must grow much more food. We can do that either by cultivating more land or by making the same land produce heavier crops. In either case more fertilising substance must be used.

Scientists in Italy, where farmers have been specially handicapped by the difficulty of getting fertilisers, have been closely studying the whole question, and have come to the conclusion that our present system of manuring is astonishingly wasteful. They have now carried out experiments which may create a revolution in agriculture.

FEEDING THE SEEDS.

Consider what happens after the farmer spreads a fertiliser on his land. Part is carried away by rain, and lost; a large part simply serves to stimulate weeds. When the crop is young, and at the critical period of its life, it is least able to absorb the fertiliser; as the crop grows and ripens its appetite for fertiliser increases, but just at that time the power of the fertiliser in the soil is nearly gone.

The remedy proposed by the Italian investigators is that, instead of manuring the soil, we should manure the seeds. They contend that instead of scattering fertiliser on the ground, better results can be obtained by allowing the seeds to absorb the fertiliser *before they are sown*.

SPEEDING UP THE FOOD SUPPLY.

It sounds most captivating, and the process, carried out in Italy with nitrate of ammonia, consists of soaking a certain weight of seeds in a weak solution of

nitrate and water for a period of from twelve to fourteen hours. After they have been thoroughly soaked, the seeds are dried in the air and sown in the ordinary way.

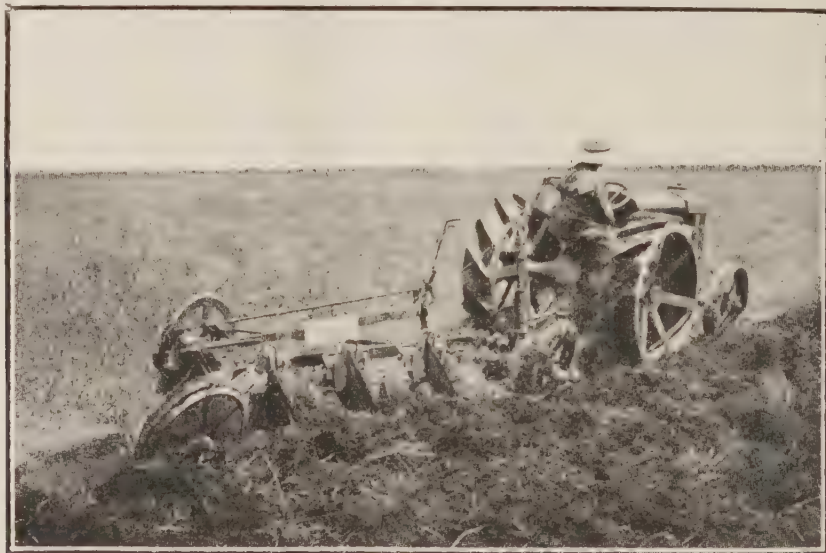
By this treatment it is claimed that the seed not only absorbs from the nitrate more of the nitrogen, which is essential to a sturdy growth, but gets it as it first starts to grow, just when the action of nitrogen is most beneficial.

Experiments carried out near Rome show that grain treated in this way shoots up earlier and grows better than untreated seeds. It is better able to withstand high winds, and, although ripening a little later, on account of its superior size, it gives 25 per cent. more grain and straw than seeds manured in the ordinary way. Moreover, it is said that only one-tenth of the nitrate that would be spread on the land is required.

THE FORDSON TRACTOR.

Amongst the many types of tractors for agricultural and allied purposes is the "Fordson," which has, like others, been put to severe tests, as shown by the following figures supplied by "Fordson" owners:—

Twenty-two Fordson owners each ploughed 1 acre in less than 1 hour; one hundred and four Fordson owners ploughed 1 acre in from 1 hour to $1\frac{1}{2}$ hours; sixty-three Fordson owners each ploughed 1 acre in from $1\frac{1}{2}$ to 2 hours; therefore the average maximum time required to plough 1 acre is 90 minutes, but this is on the assumption of each of the one hundred and four took the full $1\frac{1}{2}$ hours to plough an acre, whereas they took between 1 hour and $1\frac{1}{2}$ hours to do it. Likewise it is assumed the sixty-three took the full 2 hours.



Assumed that each of the one hundred and four averaged 1 hour 15 minutes, and the sixty-three averaged 1 hour 45 minutes, we find the real average time per acre to be 80 minutes, and maximum average time 70 minutes per acre.

This is under all varying conditions of soil, and taking into consideration that some used two ploughs and some three ploughs and 10-inch, 12-inch, and 14-inch buttons on each.

FUEL CONSUMPTION PER ACRE.

Kerosene—

Twenty-three Fordson owners state that they used $1\frac{1}{2}$ gallons and less.

Seventy Fordson owners state that they used between $1\frac{1}{2}$ to 2 gallons.

Thirty-five Fordson owners state that they used between 2 and $2\frac{1}{2}$ gallons.

Fifty-one Fordson owners state that they used between $2\frac{1}{2}$ and $2\frac{3}{4}$ gallons.

Average fuel consumption on over 179 farms under varying conditions of soil and load is 2 1.32 gallons.

Oil Consumption—

Thirty-six Fordson owners state that they used 1 pint and less per acre.

Forty-one Fordson owners state that they used 1 to 2 pints per acre.

Eleven Fordson owners state that they used 2 pints per acre.

Average oil consumed was 1.5 pints per acre.

COTTON SHORTAGE.

The "Daily Mail" (12th June) publishes the following "London Times" cable:—

"SERIOUS OUTBREAK.

"London, Friday.—The international congress on cotton, sitting at Zurich, discussed the increasing seriousness of the world shortage of cotton. British delegates urged the vital importance of developing new Empire supplies, and said that, if Governments would assist in every instance, plenty of cotton would be obtainable.

"Sir Herbert Dixon said he believed that production in America would not increase, but decline possibly, as the pink boll worm was affecting the crops, and great damage was feared if the pest spread. It was also worthy of note that a large portion of the Egyptian fields were reverting to agricultural production owing to food requirements."

We have constantly advocated the growing of cotton by Queensland farmers—not on large areas, but on the small scale of from 5 to 10 acres, the crop of which can be easily handled without much extra expense in the way of labour. The Department of Agriculture has done, and continues to do, all in its power to deal with all cotton grown in the State at a very small charge for actual cost of ginning, baling, and marketing, at the same time making growers an advance of 3d. per lb. and giving them a share *pro rata* in all profits on sales. Last season the growers received 5½d. per lb. clear on their crops—equal to £20 16s. 8d. for an average crop of 1,000 lb. of seed cotton per acre. In the old days of cotton-growing in Queensland, during the American Civil War, the farms from Brisbane to Ipswich were white with cotton crops. The farmers sold their cotton to the ginneries established at Ipswich, Harrisville, Oxley, and Brisbane for 3d. per lb., and were well satisfied with this. Certainly, expenses in those days were lighter in many respects—such as labour, cost of provisions, implements, fodder, &c. They may possibly, when the returns for 1920 are available, find that the price of cotton is already almost double what it used to be; and everything points, as above shown, to an increased demand and a serious short supply of this valuable product.

THE COTTON-GROWING INDUSTRY.

As time goes on, the growing of cotton in Queensland is attracting increased attention, due mainly to the assistance given to growers by the Department of Agriculture and Stock in the shape of annual increases in the cash advances made to them and to the supply of seed gratis. The urgent demand, both in England and the United States of America, for increased supplies of cotton cannot, apparently, be satisfied under existing conditions, especially in the latter country, where, owing to the ravages of the boll-worm, the boll-weevil, and other pests, there is a present and prospective shortage of supplies for the numerous local cotton mills, leading to a decreased export business. This is Queensland's second opportunity for establishing the industry on a firm basis, and the Minister for Agriculture has fully recognised the fact by recommending to the Government a guarantee of 5½d. per lb. for all cotton of good quality grown prior to June, 1922, and delivered at the nearest railway station or port consigned to the department, on receipt of which consignment the supplier will receive an advance of 3d. per lb., with a guarantee of a further 2½d. per lb. Having delivered his cotton, the supplier has no further trouble with it. It is ginned, linted, baled, and sold by the department on account of the owner, the charges for which work are small. Early in June last, the Minister said that this guarantee is an advance upon that offered by the Federal Government for the 1920 crop, and should be an incentive towards substantial increase in the area for picking in 1921, at a time when the prospects for the grower, in a country admirably adapted for cotton growing, are particularly bright. The Government does not by any means intend to limit the price paid for seed cotton to the figure mentioned; if the price obtained for the lint will warrant a higher return the grower will receive a higher return, but he can be assured that it will not be less than 5½d. a pound. There is a demand for cotton throughout the world that cannot be over-supplied, so that there need be no fear whatever of the want of a good market; indeed, it may be stated that Australia alone can absorb all the cotton lint that Queensland can grow for many years to come, and the demand will be an increasing instead of a diminishing one. Seed can be obtained from the department free of charge, and consequently it now rests with the farmers to do their share, by each of them planting a few acres of cotton.

We have before pointed out that a crop of seed-cotton of good Uplands variety ranges from 1,000 to 1,500, and as much as 2,000 lb. The latter quantity was obtained by Mr. W. Goos, a farmer at Tallegalla, in 1907, when seed-cotton was selling at 2d. per lb. Under the conditions above named, that crop would to-day be worth £45 16s. 8d.

COTTON GROWING.

MORE AREAS WANTED.

A cable from London on 16th May on the annual report of the British Cotton Growing Association says that the report contains encouraging details of the Association's activities, but emphasises the urgency of extending the cotton-growing areas of the Empire, especially in view of the decline in production and the increase in consumption of cotton in the United States. The Association dealt with 30,881 bales in 1919, compared with 29,190 in 1918, and 48,087 in 1915, after which the results of the war began to be felt. The value in 1919 was a record, namely, £1,500,000.

NEGLECTED INDUSTRIES.

TOBACCO.

Amongst the agricultural products of Queensland, that of tobacco—once so payable a crop in the Texas and Inglewood districts as regards pipe tobacco, and Bowen and Cardwell for cigar leaf—may be said to rank amongst our neglected industries, as indicated in Norman Cobbs' article in the "Producer's Review," republished in the May issue of this Journal. In 1912, when the Department of Agriculture availed itself of the invaluable services of Mr. R. S. Nevill, tobacco-growing in the Texas districts was raised from a Chinaman's industry to one engaging the attention of white farmers; and Mr. Nevill expressed his surprise that people did not go in for the growing of it more extensively, for after the crop is once in the field the work, though constant, is light, such as children, both boys and girls of twelve to fifteen years of age, can do just as well as men, with the exception, of course, of the plough work.

The yield of the pipe tobacco in the Texas and Inglewood districts is not far from half a ton per acre, and sometimes, with exceptionally good seasons, more, and the price something near £80 per ton; and an industrious man can take care of from 4 to 5 acres. Thus it will be seen that, to the man who is not afraid of farm work, it offers special inducements, especially at the present prices for leaf. Other crops—such as corn, potatoes, &c.—can be grown at the same time, and thus add to the farmer's income. The Inglewood and Texas districts, at this time, have, so far, grown the best of these tobaccos; and to-day there is still plenty of suitable land available. The railway reaches the country about Inglewood, and there are large re-handling houses at Texas, where the farmer can sell and deliver his tobacco. Many people are under the impression that tobacco is a winter crop, but this is not so, as Mr. Nevill pointed out. "The time for seed-sowing," he said, "depends upon locality."

In Southern Queensland, from 10th August to 10th December is about the usual time; but he considered that seed sown as late as September is in plenty of time for transplanting, for the reason that you cannot transplant till all danger of frost is over.

In the North, for cigar tobacco, from 1st August to 1st January is the usual time, as the danger from frost there is very small, and plants can also be transplanted late—say to 20th February, whereas in Southern Queensland we cannot set out later than 1st February; and that is very late.

In the South, it takes from 90 to 110 days ordinarily for tobacco to mature from the time it takes root in the field. In the North, it takes from 80 to 90 days.

The time for transplanting is any time when the weather is suitable—from 1st October until it is too late for the tobacco to mature; but it is best to have the crop growing, if possible, during the rainy season, as a humid atmosphere is necessary to obtain the best results.

Regarding tobacco soils:—Heavy forcing soils are not suitable for tobacco, as such soils produce a rank, coarse tobacco of little commercial value. The soil should be a very friable one, and for cigar tobacco a high percentage of sand is desirable; but for heavy, dark pipe tobacco a clayey soil is desirable; and for yellow, aromatic tobacco the poorest sandy soil that will produce a crop is considered the best.

SOWING TOBACCO SEED.

Mr. Nevill advised the farmers at Maryborough that tobacco seed might be sown there and further north up to 25th December, in order to ensure a good crop. North of Mackay the seed could be sown at any time. At this time of year in the South it is necessary to be very careful with the beds, as the hot sun will kill the seeds as soon as they sprout if they are not well protected, and, in fact, they will not germinate at all if great care is not taken. It is always best to put a lot of rubbish on the ground intended to be sown and burn it. This kills the weed seeds, and so save the trouble of weeding later on; and the ashes are the very best fertilisers that can be had for the young plants. The soil should be broken up to a depth of 6 in., and made as fine as it is possible to make it, and then mix the seed with ashes and sow thinly. Do not cover or rake in the seed, but take a watering pot and sprinkle the bed well, going over the bed two or three times until it is thoroughly wetted; then take old corn bags, or hessian corn bags are best. Wet them, and lay them over the beds. Remove the bags, and again sprinkle the beds. Then wet the bags and replace them on the beds about three times a week if it does not rain. In about ten days or two weeks begin to watch for the young plants, and four or five days after they make their appearance arrange sticks around the bed, and raise the bags about 2 in. off it, continuing to raise them as the plants grow. When these are about 2½ in. high, remove the covering in the cool of the day, but replace them when the sun gets hot. Do this every day, letting them stay off a little longer each day until they are nearly large enough to transplant. Then leave them off altogether. This is what is called "hardening," and the process is absolutely necessary to enable them to stand transplanting. Do not wait for rain to sow seed. When it rains, you want plants ready for setting out in the field. In order to get strong and vigorous plants, only the best and strongest should be chosen, and in order to get these put the seed you intend sowing into a tumbler of water three or four hours before they are wanted. The strong, vigorous seed will sink to the bottom, and the light ones will remain floating on top. Pour these off, and sow only those that are left in the bottom of the glass.

The following letter on tobacco seeds was addressed to the Department of Agriculture in May last by Mr. E. J. L. Claes:—

Delta,
Bowen, 19th May, 1920.

SIR,—

In a contribution to the *Producers' Review*, quoted in the *Queensland Agricultural Journal* at the present month, Mr. Norman Cobb, after pointing out that in the Lancaster County (Penn.) 1 ton per acre of fine cigar leaf is obtained as against our average of only 1,000 lb., states that "unfortunately the Queensland growers are ignorant of those improved American methods, and generally the cultivation and curing are very backward," &c.

In connection with the above, I beg to assure you that we, the growers, are only too anxious to improve our methods, which are those (now apparently obsolete) taught us by Mr. Neville, the late Government tobacco expert, and I am sure I am voicing the wish of all the Bowen tobacco men when I appeal for your department's assistance to obtain the means of doubling their harvest.

Mr. Cobb further asserts that the Spanish variety, which is almost exclusively grown in this district, is out of date, and he recommends the trial of several other varieties which he names. None of them, however, happen to be included in the list of seeds offered for sale by your department. This is rather unfortunate, because, while several growers are prepared to admit the comparative mediocrity of the Zimmer Spanish leaf in the market, they find it difficult to introduce reliable seeds of varieties that may prove more acceptable to the manufacturers.

To give my own experience in this respect, I have only to state that I purchased from the leading seeds merchants in New York several ounces of their cigar leaf seeds for this year's crop. Several beds were sown, but not a single plant came up, and a fire test for germination plainly showed that the seeds were dead. So I was compelled to fall back on my local Spanish seed, and it will be admitted that I am justified in looking with distrust on imported seed that has not been tested by responsible experts. Perhaps in this matter also your department may help the growers by importing, for distribution, reliable seeds through the American Agricultural Department.

As Mr. Cobb truly remarks, the tobacco industry in this region is capable of great development, and I am confident that a strong impetus would follow your assistance and instruction.

Yours, &c.,

ERNEST J. L. CLAES.

The Under Secretary for Agriculture, Brisbane.

The Department of Agriculture obtained seeds of different tobaccos on several occasions, and these were always tested as to their germinative powers before they were supplied to intending growers and if any failed to germinate it could only be attributed to the careless treatment in the seed beds, and to their being sown broadcast, like wheat or lucerne, without any protection from the hot sun. Let tobacco-growers try the method here described, and failure would not be recorded.

TRANSPLANTING.

The young plants having been carefully raised according to the foregoing directions, the next important business is their transplanting. The land for this purpose should be deeply and well ploughed during the winter, in order to destroy the insect larvæ as much as possible and to well rot the rubbish which is turned under. After this, the land should be kept clean by a spring-tooth harrow or a cultivator until the time for planting arrives. Before planting, however, the ground should be again deeply ploughed, not cutting too wide a furrow. By cutting only about two-thirds of the capacity of the plough, the soil is better pulverised. This ploughing should be fully 8 in. or 10 in. deep, and then double harrowed.

New ground does not require such deep ploughing as old; it also gives a lighter yield and better colour. The land should be checked off 3 ft. 6 in. each way, so that it can be cultivated both ways and kept clean.

It is best to transplant in showery cloudy weather if possible, as then the plants will not need to be watered or covered; if such weather cannot be had, then the transplanting should be done late in the afternoon, beginning when the sun is about an hour high, watering the plants as you set them, and covering early next morning. This covering will not be needed after five or six days; but a piece of bark or a shingle may be stuck in the ground in such a position as to shade the plant during the heat of the day. The plants should not be washed before setting, as they are now free of disease and insects. In transplanting use a peg made of a piece of broom handle. This should be thrust into the ground deep enough to take the whole root of the plant. Press the ground well round the root, but put the soil loosely about the stem. If properly set, the plants will take root in about ten days; and as soon as this has taken place, and the plant begins growing, go over the field with a hoe, clearing off any weeds and loosening the earth above the plant; but, after this, do all cultivating with the plough. When the plants begin to grow *thickly*, run a one-horse teasing plough with the land side as close as possible to the plants without disturbing them, thus throwing the soil away from the plants, and then across the field the same way, leaving the plant standing on a small hill. Let them remain so for three or four days, if the weather be cloudy and rainy; but, if it be hot and dry, the earth should be thrown back into the furrow from which it was taken in thirty-six hours. This ploughing in old land should be deep, so as to give a deep and well-pulverised soil for the roots to penetrate. After this, the ground should never be allowed to pack and become hard or get foul, but should be occasionally well and deeply stirred—first one way, and then across with a double shovel one-horse plough, care being taken not to disturb the roots or break the leaves, ploughing a little further away from the plant each time. This ploughing tends to keep the soil moist, enables the roots to grow and spread, and you get a healthy vigorous plant, the top leaves spreading and growing and ripening with the lower ones. If the weather is seasonable, the last ploughing may be done, throwing the soil to the plant, thus forming a hill; but, if the weather be dry, the level cultivation is better.

Tobacco should be topped and primed as soon as the proper number of leaves can be secured; do not wait for the bloom; otherwise you retard the development of the top leaves, and the plant ripens at the bottom before the top has done growing.

“Priming”—that is, taking off the bottom leaves—makes less work for you, and gives the remaining leaves the full benefit of plant life. All the leaves that are damaged should be taken off, and, if none or only a few are damaged, take four to six leaves, that the remaining ones may be well off the ground. Then pinch off the top, leaving not more than fourteen leaves, though most good growers prefer only twelve. All the plants will not be ready for topping at once, and a second topping will be necessary, when every remaining plant should be topped, if it should

even have six or eight leaves left. Suckers must not be allowed to grow, and should be taken off as soon as they appear, for, if allowed to grow, they seriously injure the tobacco. The above is necessary in order to have the field ripen evenly, and the even ripening is necessary to get a good cure.

CUTTING.

Following on this subject is a useful extract from a Bulletin issued by the United States Department of Agriculture:—

“The passage of the various constituents of a plant from one part of it to another, as the plant advances to maturity, is a capital fact common to all plants, and we see in fact that the oldest leaves gradually wither and die as they give up to the newer parts of the plant many of the matters that were contained in their cells. There comes a time when the plant ceases to draw food from the air and from the soil, and devotes itself to the purpose of concentrating the nourishment that was previously scattered through all its parts. At this period the leaves begin to change colour, light yellow spots appear upon them and the leaf or plant is said to be ripe and ready to be cut. As the leaves ripen from the bottom upward, the rational system is to pick or prime the tobacco as the leaves ripen. This is done in the Bright tobacco district, and to some extent in the cigar districts of Florida. In the other districts, including the cigar districts of the North and manufacturing and export tobacco districts, the plant is cut when the middle leaves are about ripe. If the plant is not fully matured at the time of cutting, it is liable to cure dark, or if the weather happens to be dry or cold, so that it dries out quickly, it will cure green, and be worthless.

“The time when a plant is ripe and ready to be cut is a matter of judgment and experience. There is a slight change in the colour of the leaf, perceptible in looking over a field of tobacco, which shows the experienced grower that it is ready to be cut. When the leaf is observed to change colour from a rank green to a lighter shade of green, and yellow spots appear, it is a certain indication that the constituents of the leaf have performed their duty and are going back to the stalk to be carried to the upper leaves or to be used for other purposes in the economy of the plant.

“Another test of this is to fold the leaf between the fingers, and if the leaf snaps or retains a crease where it was folded it is said to be ripe.

“A plant that is topped low, with only 8 or 10 leaves, will mature more uniformly, of course, than one that is topped high, like the Sumatra, where 18 or 20 leaves are left on the plant.

“Cutting or priming should not be done when dew or rain is on the plant, as it is liable to leave black spots on the cured leaf. In the South, cutting is not done until late afternoon in midsummer, as the midday sun is liable to sunburn the tobacco in a few moments.

“Where priming is done, the leaves are placed in baskets or shallow boxes to be carried to the drying sheds, where they are strung on twine or on wires. The leaves are put face to face and back to back, 30 to 50 to a string, according to the size of the leaf. The twine or wire is then stretched on a 4-ft. lath with a slit about 2 in. long sawn in each end, and hung in its place in the barn. In harvesting plants they will not all be ready to be cut at the same time, and it is necessary to go over the field a number of times, and cut them only as they ripen.

“Where the whole plant is cut it is allowed to wilt for several hours before being carried to the barn to prevent breaking the turgid leaves. Plants are cut and laid in rows on the ground to wilt, several rows being laid in one for convenience in handling. With the finer grades of cigar wrapper the plant is not allowed to lie on the ground directly, and in many localities the wilting is done after the plant is put on laths, upon which it is to be hung in the barn, and the laths supported on small trestles in the field or in racks arranged for the purpose. When sufficiently wilted, the tobacco is hauled to the barn, either on racks made for the purpose or carefully piled on the wagon bed. In hanging the tobacco the butts are either pierced with an iron-pointed lath, or the stalk is split all the way up, and the plants strung on the laths in this way. Before being hung up, care should be taken to remove all eggs and worms from the leaves, as the eggs are liable to hatch, and the worms do great injury to the leaves while hanging in the barn. All the suckers should also be removed, or they will continue to grow and absorb the nourishment of the full-grown leaves.

“In Cuba and Southern Florida the plant is cut in sections in the field. The three top leaves, usually the finest wrappers, are cut in one section; the rest of

the stalk is cut in sections of two each. Two rows are taken at a time, and the sections are assorted according to their grade and position on the plant. The field is gone over several times, until all the ripe plants have been cut. Boys accompany the experts, and receive the sections on their arms, the stems being turned alternately to prevent the loads from falling. When a turn has been received, the boys slide the sections on to poles placed on forked stakes at convenient places in the field. These poles, when full, are carried to the barn. The Cubans use long poles, usually 13 ft. in length. This system has the advantage of sorting the tobacco as it goes into the barn. As the curing progresses in the barn, the leaves are separated more and more for a better circulation of air.

"Cut tobacco must not be left exposed to the sun and wind, especially when lying on the ground in small piles. It must be hauled to the wilting sheds or barns as soon as the leaves are sufficiently wilted to avoid being broken in handling.

"Where priming is practised, the leaves should be left to mature further than where the entire stalk is cut, for while the stalk is hanging in the barn a translocation of the matters from the stalk to the leaves takes place, and from the leaf to the stalk; and the leaf ages and matures, therefore, while hanging in the barn. When the leaf is once severed from the stalk, however, in the process of priming or cutting in sections, there is no opportunity for this transfer, except to the very small portion of stalk which is left on the section.

"SAVING SEED.

"The grower should maintain and even improve the quality of his crop by a judicious selection of seed plants. To this end, the field is gone over several times during the growing season, and typical plants picked out possessing the greatest possible number of good points. After finally deciding upon the plants which should be saved for seed, these are allowed to grow to full maturity without removing the seed head when the rest of the field is topped. As the seeds of a plant are produced from the food material prepared in the leaves, the leaves should be left upon the seed plant until the seed is ripe. It is advisable also to have plants close together, in order that they may fertilise each other by the exchange of their pollen. Only the central spike of the plant should be left for seed, the suckers being removed as they develop, in order that all the nourishment taken up by the plant should go into the central spike to make heavy seed.

"The largest pods will contain the heaviest seed, and these should be selected for planting. 'Hellriegel found that the weight of the seed sown had, under some circumstances, considerable influence on the yield of the crop, and that the young plants from the overripe seed were decidedly the strongest and most vigorous, the others being smaller and feebler, very much in proportion as the seed from which they grew had been gathered earlier.' The heavier seeds can be separated from the light by winnowing in a light wind or by screening. Seed plants of different varieties should be separated as far as possible to prevent crossing through the intervention of insects, air currents, &c. Exchanging and mixing seed of the same variety grown some miles distant is good practice, as it tends to make the seed and plants more vigorous.

"A great deal of the trouble arises in attempting to maintain a fair strain of tobacco seed on account of the facility with which cross-fertilisation occurs in the field. For this reason the recent experiments of Dr. Doroxie, editor of the 'Hungarian Tobacco Gazette,' of Budapest, mentioned by Killebrew and Myrick in 'Tobacco Leaf,' are of great interest. This gentleman 'has propagated tobacco from slips, and claims that the leaves harvested from such propagated plants are finer and of higher quality than those of the mother plant.'

"The suckers from the plants are easily propagated in a suitable seed bed, just as slips of any of the ordinary flower plants, such as geranium or coleus. They can be readily grown to maturity in the field or in the hot house, and the seeds so obtained will actually represent the parent without change from cross-fertilisation from other plants if care is taken.

"It seems probable that, by continuously raising seed from suckers instead of from seed, Havana or other superior kinds of tobacco can be acclimated in the Northern States, and retain the qualities of the first year's crop, just as original qualities are retained by layering and grafting fruit.

"Tobacco seed will retain its vitality for ten or twenty years, but it must be remembered that as a general rule all seeds begin to lose their vitality from the moment of ripeness. The process of deterioration with tobacco seed goes on, and on each succeeding year a less number of seeds will sprout, until finally all lose their germinating power. In planting old seed they should be first tested, and the quality sown should be proportional to the vitality of the seed."

Dairying.

CHARACTERISTICS OF DAIRY COWS.

Everyone is familiar with the more usual qualities which dairy cows should possess as a rule, and which have often been described. But there are a number of less well known and less often remarked characteristics which are thought by practical writers on the subject to be of some significance, the fact being that dairy and maternal qualities are of so subtle and far-reaching a character that they influence the conformation of the body in a great variety of ways.

To quote the words of a noted American dairyman when striving to produce a profitable dairy cow: "We must breed and develop an enlarged function of maternity; the dairy cow is an animal with an enlarged talent for the exercise of maternity, and the dairy form and outline are essential to the work of a dairy cow." That these functions are largely connected with the nervous system explains probably to what a large extent dairy characteristics attach themselves to external features, and the "nervous theory" which was brought out some while ago by the above-mentioned authority helps to make this clear. It was to the effect that maternal qualities are closely connected with the nervous system; and that if we develop a race of cows which shows an increased tendency towards milk and butter-making, so in proportion do we increase both the nervous form or build and the maternal qualities, at the same time diminishing the heavy-going qualities of the fleshy type beast.

According to this theory, it will be seen that there is ample room for the opinions regarding the fairly pronounced distinctions which exist between the two types of animal, and the ideal dual-purpose cow will perhaps never be fully evolved.

Among the points referred to at the beginning of this article are such characteristics as are indicated by the conformation of the head and face, tail and thighs. The head is naturally of peculiar interest in this connection, and in a general way a long one is usually advocated, but there are differences of opinion on the point. Youatt commended length, but was no lover of *big* heads, which, he said, were seldom a good indication either of milk or beef, and a "small but long shape" which some have given as their ideal seems to be what he meant. One exponent of this subject, while admitting that it frequently means a good milker, goes so far as to say that a long head often implies a dull, apathetic, colourless animal, always the last of the herd to look out for herself, and this is hardly in keeping with the high development of brain power which has been advocated by a noted expert, and which it may be supposed is derived from a highly-developed nervous system. But a long head in moderation seems to be generally approved by farmers—in the heavy breeds, at any rate.

The mouth is among the points to which reference is seldom made, but its importance is not perhaps appreciated, though it is not maintained that points such as these have necessarily anything to do with maternal qualities. Mr. Grisdale, the dairy expert at the Central Experimental Farm, Ottawa, referring to this point a few years ago before the Dairymen's Association, remarked that a strong jaw and a large mouth are probably the best indications you can get of a good dairy cow, provided that the other parts are right. This type of mouth, together with thick and strong lips, have been commended as indications of a good digestion, and if this is so they are, of course, valuable features, and are in keeping with a good clean face and bright forehead, which, together with an eye of the right sort, are, according to the same authority, indicative of the abundant brain power above alluded to. Even the nostrils are held to be of some significance, but perhaps only in so far as a good shape here would imply good breeding and lung power, the latter being a point apt to be underrated.

The tail is certainly a feature of interest, because it seems to indicate either flesh or milking proclivities, according to its setting on. While it is inadvisable, perhaps, for it to stand well above the rump, as some people like to see it, a sunk-in tail implies meat rather than milk, because of the general compact levelness which this formation carries with it. A very shrewd breeder is said to have remarked that he would always avoid a dairy bull with a tail sunk in flesh, and doubtless he was right.

Poultry.

REPORT ON EGG-LAYING COMPETITION, QUEENSLAND AGRICULTURAL COLLEGE, MAY, 1920.

The results for the month have been, on the whole, fairly satisfactory. No outstanding scores have been made in the light section, but there has been some creditable laying amongst the heavy breeds, viz.:— E. F. Dennis's total for the month of 134 eggs, 37 of which were laid during the last seven days; Gaydon's A bird finished the month with a continuous run of 18 eggs; and D. Fulton's F bird with a run of 23 eggs, the lastnamed owner's six birds laying 138 eggs for the month. One death occurred during May, E. Oakes losing his D bird through ovarian disorder. Some fourteen birds have been in the broody coop during the month. A very noticeable feature is the almost complete absence of false moults. The weather has been showery, and abundance of green feed has been available. The following are the individual records:—

Competitors.	Breed.	May.	Total.
LIGHT BREEDS.			
*G. Trapp	White Leghorns ...	114	220
*O. W. J. Whitman	Do.	120	213
*Haden Poultry Farm	Do.	112	210
*J. H. Jones	Do.	103	204
*J. D. Newton	Do.	109	201
*W. Becker	Do.	106	197
*J. J. Davies	Do.	124	195
Geo. Lawson	Do.	103	192
*G. Williams	Do.	110	191
*S. McPherson	Do.	129	189
*T. Fanning	Do.	104	186
*W. and G. W. Hindes	Do.	107	185
*Quinn's Post Poultry Farm	Do.	87	174
*Harold Fraser	Do.	106	173
Thos. Eyre	Do.	88	165
*J. M. Manson	Do.	119	164
*E. A. Smith	Do.	86	162
A. J. Anderson	Do.	81	153
*S. W. Rooney	Do.	100	157
*Range Poultry Farm	Do.	107	156
*Dr. E. C. Jennings	Do.	90	154
S. L. Grenier	Do.	101	149
*Mrs. L. Henderson	Do.	66	148
*N. A. Singer	Do.	75	147
*Thos. Taylor	Do.	79	144
*B. Chester	Do.	91	142
C. M. Pickering	Do.	67	139
Avondale Poultry Farm	Do.	78	132
W. Morrissey	Do.	78	128
*Mrs. L. F. Anderson	Do.	66	124
Mrs. R. Hodge	Do.	79	121
H. P. Clarke	Do.	63	120
E. Chester	Do.	75	119
C. H. Towers	Do.	83	119

EGG-LAYING COMPETITION—*continued.*

Competitors.	Breed.	May.	Total.
LIGHT BREEDS— <i>continued.</i>			
*L. G. Innes	White Leghorns ...	69	118
W. D. Evans	Do.	38	107
C. Langsbecker	Do.	60	105
R. C. J. Turner	Do.	73	98
Nurse E. M. Ellis	Do.	65	94
H. A. Mason	Do.	44	84
S. Chapman	Do.	43	83
C. A. Goos	Do.	35	82
HEAVY BREEDS.			
*R. Holmes	Black Orpingtons ...	132	246
*D. Fulton	Do.	138	222
*A. E. Walters	Do.	102	205
*R. Burns	Do.	123	204
H. M. Chaille	Do.	124	197
*R. Shanks	Do.	109	181
*E. Morris	Do.	113	180
*E. F. Dennis	Do.	134	174
*T. Hindley	Do.	92	173
*W. Smith	Do.	82	165
G. Muir	Do.	107	165
*Nobby Poultry Farm	Do.	82	162
*R. B. Sparrow	Do.	86	148
*A. Gaydon	Do.	106	143
*J. E. Ferguson	Chinese Langshans ...	80	134
*E. Oakes	Black Orpingtons ...	74	121
*E. Stephenson	Do.	87	108
J. E. Smith	Do.	94	108
R. C. Cole	Do.	63	102
Parisian Poultry Farm	Do.	62	100
*J. A. Cornwell	Do.	50	88
Mrs. G. H. Kettle	Do.	77	88
G. Flugge	Do.	18	48
Total ... ..	...	5,769	9,811

* Indicates that the pen is being single tested.

RESULTS OF SINGLE HEN PENS.

Competitors.	A.	B.	C.	D.	E.	F.	Total.
LIGHT BREEDS.							
G. Trapp	41	32	40	35	39	33	220
O. W. J. Whitman	35	30	41	31	37	39	213
Haden Poultry Farm	41	24	44	39	30	32	210
J. H. Jones	37	30	37	37	38	25	204
J. Newton	44	28	35	21	33	40	201
W. Becker	34	39	38	26	24	36	197
J. J. Davies	34	34	29	41	25	32	195
G. Williams	26	34	34	32	37	28	191
S. McPherson	35	29	33	32	39	21	189
T. Fanning	15	33	28	33	37	40	186
W. and G. W. Hindes	31	26	37	31	27	33	185
Quinn's Post Poultry Farm	38	33	37	25	16	25	174

RESULTS OF SINGLE HEN PENS—*continued.*

Competitors.	A.	B.	C.	D.	E.	F.	Total.
--------------	----	----	----	----	----	----	--------

LIGHT BREEDS—*continued.*

Harold Fraser	..	..	..	29	13	35	32	35	29	173
J. M. Manson	..	..	..	30	26	40	20	21	27	164
E. A. Smith	..	..	..	34	21	33	26	27	21	162
S. W. Rooney	..	..	..	12	14	38	34	30	29	157
Range Poultry Farm	..	..	..	26	22	23	39	22	24	156
Dr. Jennings	..	..	..	19	33	27	22	30	23	154
Mrs. Henderson	..	..	..	14	26	26	20	42	20	148
N. A. Singer	..	..	..	33	21	23	35	9	26	147
Thos. Taylor	..	..	..	35	26	18	20	24	21	144
B. Chester	..	..	..	25	19	25	27	27	19	142
Mrs. L. Anderson	..	..	..	36	23	32	13	7	13	124
L. G. Innes	..	..	..	0	25	33	10	35	15	118

HEAVY BREEDS.

R. Holmes	..	..	..	..	43	38	39	36	44	46	246
D. Fulton	..	..	..	..	42	41	27	20	42	50	222
A. E. Walters	..	..	..	..	36	34	7	50	34	44	205
R. Burns	..	..	..	..	40	21	44	23	41	35	204
A. Shanks	..	..	..	..	24	10	34	43	22	48	181
E. Morris	..	..	..	..	30	36	42	8	24	40	180
E. F. Dennis	..	..	..	..	28	15	48	24	16	43	174
T. Hindley	..	..	..	..	31	39	34	42	14	13	173
W. Smith	..	..	..	..	30	44	43	86	10	2	165
Nobby Poultry Farm	..	..	..	..	21	47	18	46	24	6	162
R. B. Sparrow	..	..	..	..	35	0	39	39	4	31	148
A. Gaydon	..	..	..	..	24	44	19	0	20	36	143
J. Ferguson	..	..	..	..	23	29	24	29	28	1	134
E. Oakes	..	..	..	..	15	24	37	0	27	18	121
E. Stephenson	..	..	..	..	36	20	23	22	0	0	108
J. Cornwell	..	..	..	..	26	39	5	0	0	18	88

CUTHBERT POTTS,
Principal.

CHICKEN-POX OR WARTS.

By D. WALLACE, Rocklea.

(Continued from May Issue.)

The first and most important preventive measure against this disease is early hatching. There is no limit to the evils resulting from hatching late. The time when the last chicks of the season should be out of the shell varies to the extent of about ten days in Queensland according to latitude. For heavy breeds hatching should cease by the end of the first week in September, and for light breeds by the end of September. This applies to the neighbourhood of Brisbane, and the warmer the climate the earlier, relatively, should hatching terminate.

Early hatching supplies two things—vigour or stamina, and maturity or a ripened constitution; and these will be found to be valuable assets when chicken-pox is prevalent.

If the birds cannot be given range, they must be regularly supplied with green feed. In the absence of anything better, grass and weeds may be fed; but green feed they must have.

A weakling should never be tolerated in the flock, no matter how fine it may be in feather or other qualities. Out with the culls. Retaining them is only courting disaster.

Another important consideration is dry and well-drained yards. If not naturally so, they should be made so as much as possible. Fowls have a peculiar predilection for damp shaded spots in the day time, such as in a hollow with overhanging foliage. They should be kept away from these. They are largely creatures of habit, and after resorting to such a place for some weeks they make it offensive and dangerous from a hygienic standpoint. Fresh sulphuretted calcium, in daily doses of 6 grains per bird for the heavy breeds and a grain less for the light breeds, has proved to be a reliable remedy. It should be dissolved as well as possible in the water to be mixed with the mash, and the whole very thoroughly worked so as to ensure a uniform distribution of the drug in the feed. The dosage should be accurate; and, when the correct quantity for the number of birds to be treated has been ascertained, it should be measured and the measure used as a guide for ready use. Animal food—unless fresh cooked meat is fed—should be cut out except when the disease is present only in a mild form; and it is as well also to substitute a mash feed in the evening in lieu of grain, giving 3 grains of the drug in the morning and 3 grains in the evening. In addition, a teaspoonful of Epsom salts should be used to each quart of drinking water, no other water being allowed.

In flocks of any size it is impracticable to employ any external treatment save in the case of very badly affected birds. A mixture of tannic acid and glycerine should be applied to the sores of such birds.

Sulphuretted calcium may be used also as a preventive in somewhat smaller doses without doing away with the grain feed. The well-known "Douglas Mixture" is a capital thing to use in February and March. Judiciously used, Epsom salts is very beneficial at any time, but it should not be continued for too long a period.

On no account should birds suffering from infectious diseases of any sort be sent to market. Such a course only tends to spread the disease and does the sender harm in that it is damaging to the industry, apart from the cruel loss inflicted on other poultrymen, as the following instance will show:—

A farmer close to Brisbane had 700 head of fowls, and, deciding to obtain some turkeys for incubating eggs, he purchased ten of these birds at a market in town for £2 12s. 6d. When he penned them on his farm it was soon apparent to him that something ailed them, and the bowel trouble they suffered from rapidly developed. Some fowls that had access to the turkey pen soon showed similar symptoms, and in a short time the disease went through the entire flock. The trouble appears to have been septic enteritis, which closely resembles fowl cholera. To cut the story short, the whole flock, except thirteen birds, succumbed. All the turkeys also died, save one, and she died soon after on a setting of eggs, after having apparently recovered. Fortunately this man was not unscrupulous enough to send his birds to market from time to time as soon as they began to show signs of the trouble, or there is no telling where the evil may have ended.

The lifelong immunity acquired by birds that have had warts, however mild, indicates that therapeutic, and also more especially prophylactic, vaccine treatment would be very effective; and it is quite within the bounds of possibility, considering how rapidly the industry is developing, that this will be available in the not too distant future. The main consideration is a reasonably cheap application of the principle. The flocks of the future will be worth it; indeed, not a few of them are at present. Single birds have changed hands in Australia for as much as fifty guineas, and others have been imported at much higher figures.

MORE ABOUT CHICKEN-POX.

This subject has been dealt with at some length, at various times, in this journal. It is one of great importance to poultry-breeders, and we gladly publish what is written on the disease by experienced poultry men. We have now another very useful communication from Mr. D. Wallace, dealing with the means for combating and overcoming this trouble. We mentioned to him that, some years ago, when we ourselves bred prize poultry, a number of Brahma chickens were badly affected, and a remedy was suggested to us, which proved successful, all the birds having recovered. Mr. Wallace deals with this remedy in the following paper:—

“The treatment you refer to is known among poultry men as ‘dipping.’ No doubt the ammonia in urine has a more or less antiseptic effect on the sores themselves, and much would depend on the condition of the birds, the stage of the disease, and the severity of the attack. Two seasons ago, at Woodridge, I had an opportunity of noting the effect of dipping on an affected flock there. The owner, in the belief that mosquitoes were responsible (we never saw any save the *Culex vigilax* mosquito there), had for weeks before been laboriously spraying his birds on their perches each evening with kerosene oil. Some of the chickens he had protected in gauze-fronted coops. In spite of all his trouble, his flock became infected in common with other flocks in the place. He practised dipping for a while; then he was persuaded into buying in town, for 16s. per lb., some stuff, which I found to be alum with a sprinkling of pot. permang., for use in the drinking water. But the disease ran its course, and he had one or two birds returned from Gatton, where he had sent a team, for the reason that they were found to have warts. He was one of those people who would never be advised. My own birds, treated with *calx sulphurata*, got the trouble so very mildly that it was only noticeable here and there. In that year I hatched some chicks in March, which were wholly immunised for the time. I have them still, and they are the parents of my two birds competing at the Zillmere single-pen test.

“Chicken-pox is a disease of the blood. *Calx sulphurata* is recognised as having the property of remedying a suppurative condition of the blood. It supplies the element or elements necessary to enable the bird’s system to overcome the effects of the toxic products of the chicken-pox microbe, and also, by way of prophylaxis, to partly or completely resist it when infection is about. Magnesium sulphate (Epsom salts) does the same thing in a lesser degree. Both combined confer the maximum benefit.

“Though milder and less dangerous by far than human syphilis, it is analogous to it in that when the *Spirochaeta pallida*, or, as it is now more correctly termed, the treponema pallidum, is destroyed in the system the flesh recovers. It would be of little use to attempt to heal the skin while the organism responsible remained unmolested throughout the system.

“Of course, treating the eruptions themselves with an antiseptic tends to subdue suppurative staphylococci and streptococci which add their quota to the toxins already produced by the chicken-pox organism; but once this latter is overcome, the blood may be relied on to use its own antibodies against the organisms mentioned that find a haven in the abraded surfaces.

“I have been experimenting in a small way with the birds at my disposal, in order to ascertain whether, when a male has been removed from his hens and a second male substituted, any eggs laid by the hens after those fecundated by the second male could be fecundated by the first male, seeing that chicks have been hatched from eggs from hens after removal of the male for three weeks. In other words, when Male No. 1 has been permanently removed and Male No. 2 at once put in his place, after you start getting chicks sired by Male No. 2, is it possible to get an occasional one sired by the removed male within three weeks or so of his removal?

“A single experiment, conducted on Mendelian lines for the purpose of identifying the chicks, without which nothing definite could be accomplished, has shown me that the question must be answered in the affirmative. If of any use for publication, I shall send it along.”

The Orchard.

FRUIT-GROWING AND IRRIGATION METHODS IN CALIFORNIA.

By THE HON. J. M. HUNTER, Agent-General for Queensland.

409 and 410, Strand, London, W.C.2, 1st March, 1920.

California, as the result of a splendid campaign of publicity and advertisement, is world-famous for its fruits and orchards. In many respects it deserves to rank high, for it supplies an extraordinarily large market with first-grade fruit, for which there is always a big demand. But, compared with many fruit-producing centres in Queensland, of which the outside world has never heard, Californian orchards are over-boomed.

Nature has not been so bounteous, even in California, as in Queensland, and during the investigations I made of the fruit-growing industry, with special reference to irrigation, I was repeatedly shown trees producing, after six or seven years, fruit that is grown in Australia in three. Summed up, my conclusions are that Queensland is pre-eminently suitable for fruit-growing, and that with an equal expenditure of capital and labour our State is undoubtedly a much more bountiful and profitable field for the orchardist than any part of America.

The Californian orchardist has neglected nothing that will assist him in making a success of his industry. The Californian irrigation schemes are well developed, and are a practical guarantee to the fruit-grower against drought. Some of these schemes supply a large number of farms, whilst some of the more prosperous orchardists prefer an individual scheme of their own, by means of which they can irrigate at their own convenience, and not at the discretion of the irrigation authorities. Individual irrigation is, however, rather an expensive project, as it means the installation of a large and expensive reservoir on the farm from which to draw supplies.

NO FENCES.

The most striking feature of the fruit-growing industry in California is the almost complete absence of fences around the orchards. This even applies in the thickly populated centres and near townships, and, in addition to proving a big saving in initial outlay and upkeep, is a decided convenience for the marketing of the farmer's products. It would appear, however, to invite theft from passers-by, but the trees on the borders of the roads are as thickly covered with fruit as those in the centre of the orchard, and I was assured that fruit-stealing is practically unknown. This is not on account of any extraordinary moral qualities on the part of the Americans, but simply because the Government has passed such stringent laws for the protection of the industry that fruit-stealing in California is regarded as a criminal offence. A fine used to be the punishment, but it proved futile. Now gaol is the penalty without the option.

The fruit is produced in very large quantities, but, despite this fact, it is not uncommon to have to pay 3d. or even 6d. for a good orange, especially on trains. That the industry is a profitable one is indicated by the comfortable homes and well-ordered orchards. It is the exception for the orchardist not to run his own motor car, and with the marvellous roads of California motor traction is very largely availed of for the conveyance of goods to market or to the train. On five good acres a man "can raise a family." In other words, he can earn £800 a year, though it must be remembered that the cost and standard of living in America are much higher than in Australia.

IRRIGATION.

One of the most successful citrus orchards in California is that of Mr. E. B. Griffith, of Azusa, near Los Angeles, which I was given an opportunity of inspecting. From this farm, I was informed, the owner is netting 12,000 dollars a year, after paying for cost of water, cultivation, fertiliser, and labour. This is one of the orchards that has its own irrigation project. The storage supply is situated on the farm. Pipe lines are laid at an interval of every fifteen trees, which latter are 20 ft. apart, in a row, a similar distance of 20 ft. separating one row from another. The pipes are of cement and 8 in. in diameter.

At the head of each row is a tap or "stand-pipe," arranged with four jets and regulators to direct the flow of water into the four furrows which separate the rows of trees. The orchard is irrigated once every five weeks, and the object in only watering fifteen trees at a time is to get more even distribution. Half as many trees should be irrigated per hour as the miner's inch flow, the contents of a miner's inch being approximately $13\frac{1}{2}$ Imperial gallons. For instance, a 50-inch flow should irrigate twenty-five trees hourly.

STAFF EMPLOYED.

The orchard covers 180 acres, on which a staff of eight men is employed to attend to pruning, irrigation, and cultivation. One is engaged solely as a pruner, and, when necessary, extra men are hired to assist him.

There is a co-operative organisation which renders invaluable help in the picking of the crop, the association sending men to assist in the picking, the cost being deducted from the proceeds of the crop.

The method of picking is interesting. After removal from the trees, the fruit is put into a sack hung over the man's shoulder. It is then placed into a larger case and hauled to the co-operative packing-house, where the fruit is graded into "fancy," "choice," and other grades.

PESTS.

The orchardist has to combat a variety of pests, and his experience in fighting them may be of value to the Queensland grower. The worst pests with which the Californian fruitgrower has to deal are the Red Spider, the San José Scale, Scaly Bark, and Gummosis, the lastnamed being due to allowing damp soil at the budded joint.

Experience has proved that Red Spider can be most effectively treated with sulphur and lime, applied either dry or by wet spray. The solution for the latter can be bought in concentrated form in drums ("Orchard Brand" or "Rex Brand"), and before use is diluted in water. A special spraying machine is used, and is drawn through the orchard between the rows by two horses. A tank containing the solution is attached to the machine, and the liquid is pumped at a pressure of 250 lb. It takes two men to work the plant, and sometimes a third is required to drive the horses.

The treatment for Scaly Bark is still in the experimental stage, but the trouble is certainly diminished by the application of a preparation known as "Bordeaux Mixture," the principal ingredient of which is copper sulphate.

For San José Scale fumigation is employed, the operations being carried out by a co-operative company, the gas used being extremely volatile and very dangerous. Prior to treatment a large heavy calico or light canvas tent is thrown over each tree, and if the tent is not large enough to be air-tight earth is shovelled round the edges. An accurately trained man, whose work is of extreme importance, then judges the exact amount of gas that should be pumped under each tent, and on his judgment largely depends the success or ruination of the farmer. After fumigation, the tents are allowed to remain on the trees for forty minutes, but are then removed. The solution used is liquid hydro-cyanic acid gas, made by treating potassium cyanide with sulphuric acid. It has been invented locally during the last two or three years, and is really a very good remedy, the life of the tents themselves being trebled by this as compared with the old treatment. As the tents cost £50 each, this means a considerable saving.

GENERAL.

Though the best crop is oranges, lemons are also extensively grown. Of these the best fruit is picked green. They are picked by size, after measurement by a ring. After picking, they are taken to the packing-house and sweated by steam in an air-tight room belonging to the co-operative producers. They are then laid on trays in the packing-room and kept there for some weeks, after which they will keep for a remarkably long time.

It may be noted that the rubbish from the pruning is cut up and used for manure, and that peas are used as a cover plant.

Should you desire a further elucidation of any of the points raised, Mr. E. B. Griffith, the gentleman whose address is given above, would be pleased to furnish you with any information if you write to him direct.

ERADICATING FRUIT PESTS.

In the May issue of the journal we republished from the "Brisbane Courier" a paragraph on the discovery of a new method of dealing with fruit pests. We have since had an interview with Mr. W. H. Parker, chairman of the Q.F.I.T. Society, who is one of the earliest and most successful orchardists in this State. He described the method of dealing with citrus pests as published, and explained how the inspiration came to him—by considering how medical men deal with many diseases in human beings by treatment through the blood. That being so, he thought, "Why should not diseases of plants be treated through the 'sap,' which is the life blood of the tree?" He then experimented, and the result is as described in the following article in the "Moreton Mail" of 2nd April, 1920:—

"The idea is not by any means new. The specific used may be, but the method of application was proved to be a success upwards of a quarter of a century ago. The honour of the discovery is claimed by Mr. W. H. Parker, the chairman of the Q.F.I.T. Society. He, as is generally known by Queensland fruitgrowers, is a very old hand at the game. He was born on an orchard, and has been interested in fruit-growing for about three score years. About a quarter of a century ago some of the trees in his famous 'Glen Retreat' orchard were in a very bad way. He had ordered their removal when a thought struck him, and he experimented. He bored holes in them with an auger, cleaned them out, and filled them with flowers of sulphur. He trusted to the sap to do the rest. And the sap did not fail him. The trees flourished exceedingly and bore such good fruit that samples of Paper Rind, St. Michel's, and Queen oranges, sent by him to Mr. F. Coffey, of Sydney, then the leading nurseryman of New South Wales, were very highly praised. Coffey pronounced the fruit to be excellent and some of the finest that he had ever seen. It is a great pity that Mr. Parker did not follow up his experiments. As is well known, he is the 'discoverer,' or, to be more correct, the propagator of the now world famous 'Beauty of Glen Retreat' mandarin. Had he wished, he could have made a fortune out of that beautiful fruit. But he did not do so. On the other hand, he distributed it free amongst the people of Australia. Had he followed up his sulphur hole-in-the-tree cure, and changed the name of the specific, it is quite on the cards that another fortune could have been won. But Parker is one of the curiosities of these days. He works for the public good—without fee, and without reward.

PINEAPPLE-GROWING.

A correspondent, some time ago, propounded the following question on this subject to the editor of this Journal, to which the replies are appended:—

1. How long a time elapses between the planting of the suckers and the first production of marketable fruit?

Answer.—From twelve to twenty months (except where suckers throw fruit as soon as planted), according to the type of suckers, and the time of year when planted.

2. How long between the first appearance of fruit on the sucker and its readiness for market—summer and winter?

Answer.—Rough Leaf, about four months in summer—five months in winter. Ripley Queen, about four and a-half months; seedlings, about four and a-half months.

3. How long between first fruit and subsequent fruit from the same stock?

Answer.—The stock which has borne a fruit will bear no more. The subsequent fruits follow from the suckers.

4. Should the buttons that grow on the stalk beneath the fruit be removed when the fruit is gathered? If so, why?

Answer.—Some plant the buttons from the Common or Rough Leaf; but these are of no value for planting for a marketable product. Buttons from Smooth and Ripley Queen pines are better for planting than strong plants, as the first fruit from the button is marketable, whilst that from the sucker is not.

5. If buttons are allowed to remain on the stalks, will they bear fruit; and if so, at what period?

Answer.—Remove them, plant them out, and they will bear in two years.

6. Which are best for planting purposes—suckers, tops, or buttons; and how long between planting and bearing of each?

Answer.—Suckers are the best in the case of Rough Leaf pines. Tops will, it is said, produce better fruit; but it takes two years and more before they fruit. Buttons, except those above mentioned, are not worth planting.

7. Is the mealy bug really detrimental to the fruit? What means should be taken to combat it?

Answer.—The mealy bug does no harm to the fruit; but it should be brushed off before marketing the latter.

8. What is the best manure for pines; how should it be applied; what season of the year is best; and how often?

Answer.—The best manure for pineapples is stable manure. If this is not obtainable, the best results will be obtained from a complete manure containing at the rate of 150 lb. of pure potash, 75 lb. of nitrogen, and 75 lb. of phosphoric acid to the acre. Bone dust by itself, applied at the rate of 1,000 lb. per acre, shows no results at first, as it is a slow-acting manure. Nitrogen is of vital importance. Green manure (cow-peas) may be ploughed in, and suckers planted during the next season. Shirley's, Graziers', and Redbank manures may be applied about August, and again, after the summer crop is off, to give good growth during the autumn and winter. Plough in. Plant Smooth-leaved pines in rows $4\frac{1}{2}$ ft. apart every three years. They do not spread like the Rough-leaved.

LISBON LEMONS GROWN AT MOOROOKA.

By F. E. FRIEND.

Moorooka is a suburb 5 miles from Brisbane. The tree was set in July, 1916.

The several branches had to be staked, in order to assist them to bear the weight of fruit.

The ground is a clay subsoil, and the top soil has been judiciously manured. These lemons are selling at 2s. and 3s. per dozen.

It can be easily seen from the above that a good lemon orchard would be a paying proposition.

This tree was purchased from John Williams's nursery at Sunnybank.

The first crop of lemons totalled twenty-six dozen, in March, 1919.

[The two photos. supplied were not sufficiently clear for reproduction.—Ed.]

THE HOME GARDEN.

FLOWERS AND FRUITS.

Care in treatment is more necessary than heavy manuring for fruits and flowers. But they like attention from the compost heap now and again. It brightens them up wonderfully. The main requirement, however, is to keep insects and other pests in check. This is done very effectively by close pruning of the trees, so that they may not overbear and exhaust themselves, and by destroying insects, fungus growths, &c. These things require attention here, as they do in all other lands. Most of the pests of the garden are in a dormant state during winter, and they can be destroyed most effectively at that time. A wash or paint made of lime (4 lb.), flour of sulphur (2 lb.), water (2 gallons), and as much clay as will make a thick paint, acts as a manure for the trees, and it kills insects, fungus, &c. It should be put on the trees thickly all round the limbs and as far up the branches as possible; and, then, to aid us still further, we can use potash and other substances as washes, or by showering them upon trees and crops, and so kill insects, &c., and manure the land at one and the same time. Men have to attend to such matters in all parts of the world where successful agriculture is carried on; and we are neither better nor worse off than others in that respect.

Tropical Industries.

THE MAROOCHY SUGAR DISTRICT.

One of the most picturesque sugar districts in Queensland is that known as "the Maroochy." On each side of the river good cane farms are to be found, and, as the rainfall this year has been much more favourable than in other Southern sugar districts, the crops are looking particularly well, upwards of 50 in. of rain having fallen there since the beginning of the year. The General Superintendent of the Bureau of Sugar Experiment Stations, who has been visiting that area, reports that the cane is looking excellent and making fine growth. A highly successful meeting of canegrowers was held at the School of Arts, on the Maroochy River, on Tuesday evening, 1st June. The importance of growing more sugar for Australian requirements was strongly urged, and Mr. Easterby dwelt upon improved cultivation and fertilising methods as great aids to increased production. Insect and cane pests were also touched on. A large number of questions bearing on the industry were put at the end of the meeting, and a conversational discussion followed. As an example of what can be achieved in connection with increased production, it may be mentioned that the following day Yandina was visited, and a new area of land opened up by Mr. Bowder (a well-known resident of the Yandina district) was inspected. At the beginning of November last year this land, which is situated on the railway line between Nambour and Yandina, and is partly forest and scrub, was under heavy timber. The land was rapidly cleared, and to-day there is a highly promising cane crop in sight upon 70 acres. It is Mr. Bowder's intention to put in 200 acres of cane in all for the Nambour mill. The ground has been as well cultivated as possible with the hoe, and the cane is well grown, excellent in colour, and thriving splendidly. Mr. Bowder deserves the greatest credit for his enterprise, which should, it is hoped, have a good effect in the district, and eventually lead to the Nambour mill being fully supplied. Already other adjacent pieces of new land have been also put under cane.

RATS IN SUGAR-CANE.

The following paper on the rat trouble in sugar-cane will doubtless be read with interest by Queensland planters. From our own experience, we can vouch for the loss sustained by rats on plantations where these were numerous. Some years ago we were greatly troubled by the rodents on a plantation at Pimpama (Ormeau); but there was no remedy tried which was successful. The paper alluded to is by S. H. Skaife, M.A., Entomologist, School of Agriculture, Cedara, Natal, who writes, in the "Journal of the Department of Agriculture" of the Union of South Africa, as follows:—

On the whole the sugar planters in South Africa are singularly fortunate in having very few pests of importance to contend with. Compared with the conditions found in other sugar-growing countries, the plantations here are remarkably free from such troubles as fungous diseases, borers, mealy-bug, froghoppers, &c. Recently, however, the sugar farms on the Umfolozi Flats have suffered severe losses from the depredations of rats.

The rats in question are not the cane rats proper (*Thryonomys swinderenianus*), but four or five different species of ordinary field rats. They are present in enormous numbers in fields of cane ten months old and older. Cane younger than ten months is not troubled much by these rats, as it does not seem to afford them enough shelter against owls and hawks. The rats are found on all the farms along the banks of the Umfolozi River, but in most cases the damage is moderate compared with what is found on two or three farms along the north bank. On these farms the rats teem and cause great damage by gnawing through the base of the cane, causing it to fall and dry out. Mr. Jack Martens, of River View, whose farm is perhaps the worst infested of all, was cutting during November last (on the occasion of the writer's visit there) only 7 tons of cane to the acre instead of an average of 35 tons.

The rats causing the trouble are nearly allied to the common house rats, and resemble them closely in general appearance. They are apparently widely spread in South Africa, yet it is seldom we hear of them causing such serious damage as related above. They are reported to be giving trouble at Empangeni, not as a pest of sugar-cane, but as a nuisance in a cotton field where they robbed the bolls

as soon as they were open, removed the seed, and lined their nests with the fibre. An experimental plot of cotton on Mr. Duncan's farm, at Umfolozi, was treated in exactly the same manner, and, although the plants did well, there was no cotton to be gathered, as the rats took it all.

The trouble at Umfolozi seems to be entirely due to an upset in the balance of Nature. The farms in this district suffered severely from floods in February, 1918; and the planters state that hundreds of snakes were killed by these floods. Formerly snakes were very common in the plantations, but now they are seldom seen. Thus the rats were rid of one of their chief enemies, and consequently have been able to breed enormously under the ideal conditions of an abundant food supply, ample shelter, and freedom from persecution. Hawks and owls abound, but as the rats make their homes amid the dense growth and thick trash of the older fields they are practically immune from attacks by these enemies. The theory that the present outbreak is indirectly due to the floods is borne out by the fact that the worst-infested farms are those which suffered most from the floods.

In all probability the balance of Nature will be restored sooner or later. The natural enemies of the rats will be attracted by the abundance of their prey, and in the presence of an ample food supply they in turn will breed up and eventually restore the rodents to their original numbers. But in the meantime something has to be done to check the damage.

The chief object of the writer's visit to Umfolozi early in November last was to try out a virus kindly supplied by the Union Commerciale, Smith street, Durban. This virus is manufactured by the Pasteur Institute, Paris; it is sent out in tubes and known as "Pâte Verte." It is said to have been highly effective against rats in the trenches during the late war. The application of the virus is very simple; it has to be spread on bait and placed where the rats can get at it and devour it.

Two dozen field rats were captured and placed in a large roomy cage. Every day for a week these rats were fed on short lengths of sugar-cane smeared liberally with the virus. They ate the cane quite freely, yet at the end of the week all were as healthy and happy as some others which were not fed on the virus. Either these particular species are immune from the organisms which are pathogenic to ordinary rats, or else the virus had lost its virility owing to its age. One of the first essentials in using a virus is to obtain it as fresh as possible, otherwise the disease-producing organisms may die out or lose their virulence. The virus used at Umfolozi was at least two months old, and this may have been the cause of its failure to act.

SEVERAL POISON BAITS

were tried on other caged rats to see if a bait could be found which was more attractive than sugar-cane. The poison used in every case was a sweetened 2 per cent. solution of strychnia hydrochloride. Extensive experiments in America have proved that strychnine is about the best poison to use in the destruction of rodents. The soluble hydrochloride was used, as it is more easily applied to the baits in the form of a solution than the insoluble strychnine crystals. Raisins, slices of potato, sweet potato, carrot, and short lengths of fresh cane were soaked in the 2 per cent. solution for an hour or so and then placed in the cages with the rats. Next morning twelve out of the twenty rats were dead, and during the day seven more died, leaving only one alive. The raisins, potato, sweet potato, and carrot had been left severely alone, but the cane had been freely eaten. Thus it was found easy enough to destroy cage specimens; but the application of the bait under field conditions was a different matter. The poisoned cane could not be scattered broadcast owing to the danger of oxen finding it and eating it. It was also found impracticable to search for the holes and place the bait down each hole, owing to the dense growth of the older plantations and the thick covering of dead foliage.

A third method that was tried seemed more hopeful. It is the practice of the planters to burn the trash and dead vegetation before cutting their cane. By surrounding a field as it was being burnt, it was found that very few rats were driven out by the fire and still less were found dead after the fire. Thus it was concluded that they were all driven into their burrows by the fire and an attempt was made to dig them out. The majority of the holes were found to be lodged

among the roots of the cane, consequently it was impossible to dig out the rats without injuring the roots to a certain extent. The burrows were by no means deep and were easily opened up. In nearly every case one or more rats were found at the bottom of each burrow, and in some cases as many as ten were found in one hole. The rats were dazed and stupefied by the fire, and were easily caught and destroyed.

Thus we have here a comparatively simple means of getting this pest under control under the present conditions. The planters could burn off just enough cane early in the morning to suffice for the day's cutting. After the cane has been cut, the natives could be set on to dig out and destroy the rats on the piece of land just cut. It would be inadvisable to leave the destruction of the rats till next day, for from observations made it would seem that the great majority of the rats, if not all, trek overnight from the field that has been cut into the neighbouring standing cane.

From the planters' point of view there are two objections to this measure. First, the roots of the cane are somewhat injured by the digging; and, secondly, labour is scarce and difficult to obtain. But the need for some such remedy is desperate, and the present writer is convinced that the loss entailed by the damage to the roots and cost of labour will fully be set off by the increased crops obtained.

The expense and trouble of the suggested remedies are surely justified in the case of a pest which causes such heavy losses as the present one, amounting to 75 per cent. of the crop or more on at least two of the farms visited.

The planters are very keen on the idea of a virus which will start an epidemic among the rats and eventually wipe them out. Nothing could be better, provided such a virus could be found. In the first place, although several viruses have been put on the market at various times, seldom have any of these proved satisfactory. The rats in the trenches in Flanders were congregated in large numbers over small areas, were mostly ravenously hungry, and were easily induced to take the baits offered. Under these conditions the use of a virus proved very effective, but it is extremely doubtful whether the same effects would be obtained by the use of a virus in the cane fields. In the second place, it is very difficult to obtain fresh virus in South Africa. The writer made inquiries of most of the big dealers in agricultural supplies in Pietermaritzburg and Durban, and only from the Union Commerciale was he able to obtain any at all. The latter firm had only two tubes in stock, and these were generously placed at the writer's disposal for experimental purposes. This meagre supply was all used up at Umfolozi with the results detailed above. Thus it would seem that the planters' hope of the pest being overcome by the use of a virus is doomed to disappointment, and that some such measures as those discussed in this article will have to be adopted, troublesome and expensive though they seem.

ARMSTRONG-WHITWORTH AND CIVIL ENGINEERING.

To those who have watched the recent operations of the great Armstrong-Whitworth concern in the share markets, it will occasion no surprise to hear that they are preparing to add civil engineering and public works contracting on a large scale to their extensive enterprises.

We understand that this civil engineering department has now been formed, under the control of Mr. Robert H. Mackenzie, and will commence operations immediately.

The firm's recent amalgamations place them in the strongest position for undertaking big contracts of this nature in any part of the world. In addition to the great resources of their works at Elswick and Openshaw, they also have the assistance of Messrs. Armstrong and Main for constructional work and of Messrs. Crompton for electrical undertakings. Their recent purchase of Pearson and Knowles shares now places them in control of important supplies of raw materials and completes a combine, the organisation of which will enable them to undertake throughout civil engineering contracts of any magnitude. This may be said to be a departure in regard to civil engineering practice which will materially assist in the development and future prosperity of the Armstrong-Whitworth interests.

Botany.

ILLUSTRATED NOTES ON THE WEEDS OF QUEENSLAND.

By C. T. WHITE, F.L.S., Government Botanist.

No. 17.

NEEDLE BURR (*Amarantus spinosus*, LINN.)

Description.—An erect, much-branched, glabrous annual of 2 to 3 ft., spiny at the leaf axils; spines straight, $\frac{1}{4}$ to $\frac{1}{2}$ in. long. Leaves long-stalked, broadly lanceolate, 1 to 4 in. long, $\frac{3}{4}$ to 2 in. broad. Flowers in clusters in the leaf axils and also in long terminal spikes; both clusters and spikes spiny. Seeds small, lens-shaped, black or reddish black, smooth and shining.

Distribution.—It is a common weed over the tropics and subtropics of the world; it has been naturalised and is an abundant and aggressive weed in Northern Queensland for many years, and has recently made its appearance in more southern parts, specimens having recently been sent in to the Weed Pest Committee of the Commonwealth Bureau of Science and Industry from the Rosewood Shire Council, and I have also seen it about Brisbane. Whenever seen in new localities it should be immediately destroyed, and the above description and accompanying illustration should enable persons to easily identify it should it make its appearance in their district.

Common Name.—In Queensland it is usually known as "Needle Burr." In the Southern United States of America it is known as Spiny Amaranth, Soldier Weed, and Prickly Careless Weed.

Uses.—In tropical Asia the young plants and tender shoots, as with others of the genus, are used as food by the natives, being cooked in the same way as spinach.

Eradication.—As the seeds have considerable vitality in the soil, efforts should be made to prevent seed production, and the plants should be hand-pulled or closely hoe-cut before the flowering heads and spikes develop, or, at any rate, before the seeds ripen.

ALGAROBIA SEED.

With reference to the advertisement to the effect that Dr. Hastings Reed, Cairns, would be pleased to supply imported seeds, we have since been informed by him that he has exhausted his supply of seed, and applicants are hereby notified to that effect.

PLATE 1.—“NEEDLE BURR” (*Amarantus spinosus*).A, Seed (natural size). B, Seed ($\times 10$).

Science.

WATER-FINDING.

At one time it was customary to look upon a person claiming to have the power of locating underground water as a visionary fanatic. Yet to-day not only is it accepted as a fact, but that not only water but oil can be located, as has lately been demonstrated by Mr. Arthur Morry, surveyor and engineer in the Department of Agriculture and Stock, who has located a large oilfield near Brisbane, has formed a strong company to work the field, and the necessary machinery has been provided. In all cases of finding water Mr. Morry has been able to indicate the depth at which the water would be found; but, singular to say, he unerringly has stated whether the water would prove to be fresh or salt, giving also the width of the stream.

So far back as 1908, we published the following notes on the subject:—

Such a gift (we said) is one not to be despised in a country like Australia, some parts of which are devoid of surface water. We believe that there are some very successful water-finders in Queensland, but their modesty is so great that we seldom hear of their doings and of their methods from themselves. In New Zealand a clergyman has a wonderful gift in this direction—the more wonderful since he uses no rod whatever. He has been very successful in locating water in that country, and has given some account of his methods to a representative of “*The New Zealand Farmer*,” from which journal we take the following account of the Rev. Mr. Mason’s operations:—

Considering that the fact of water-finding is as well established as the demise of the late Queen Anne, it is astonishing how many people know absolutely nothing about it, and how many look upon it in the same light as telling fortunes by cards or tea-cup reading, and dismiss it all as “fudge.” The divining rod has probably at times been used as a means of deception, but so have other things which, in the hands of the proper persons, are instruments for good; and the broad fact of being able to locate the position of underground streams of water, or the pools from which artesian wells are tapped, is as unassailable as the statement that the needle of the compass points north. The power is such a remarkable one that no wonder it was in by-gone days classed with the black art by the ignorant, and even in the light of present-day knowledge one cannot see it manifested without a feeling of astonishment and something approaching awe. The fact that the power is possessed by so comparatively few, and that thousands could walk over the same ground till they dropped from sheer exhaustion without experiencing any of the sensations which tell the water-finder that he is over living water, is in itself sufficiently remarkable and is quite enough to prove to the “what I don’t understand I don’t believe” class of persons that the whole thing is fudge.

It is usual for water-finders to carry a forked stick, but Mr. Mason dispenses with this, and simply stretches his hands out. As soon as he comes over living water, he is affected with a trembling which seems to be in proportion to the size of the body of water over which he is standing. The pipe at his feet marks the spot at Richmond Hills where water was found in abundance at 50 ft. after an unsuccessful attempt had been made at twice that depth only a few yards away.

Round about Auckland there are a good many settlers whose opinions on the subject are very different from those they held not so very long ago. At Otahuhu lives the Rev. Harry Mason, vicar of Holy Trinity Church, and he is one of the few in New Zealand who have the gift of locating water that is hidden from the ken of ordinary mortals. There are hundreds of well-authenticated instances in which he has found water for people who were badly in need of it, and, as the late Mr. Samuel Luke once said to the writer, “I don’t know what the people out our way would have done this summer if it had not been for Mr. Mason.” The numerous cases cited in support of his success, and also the somewhat unusual circumstances—that he was a clergyman, and did not make a profession of finding water—led a “*New Zealand Farmer*” representative out to the village one day recently to investigate first hand. After some difficulty—for he has a cordial hatred of publicity—Mr. Mason was induced to talk about this gift, or power, or whatever we decide to call it, and, as he had had the advantage of a scientific education, his remarks on the matter are full of interest to the student of the question, and those who know nothing of it will see that water-finding is simply a manifestation of some force of which we have as yet only a very elementary knowledge.

DISCOVERING THE POWER.

“It is a rather peculiar story,” said Mr. Mason, in answer to a question as to when he first became aware that he had the power. “About ten years ago, when I was in the Taranaki district, I met a Dr. —, who was travelling leisurely round

the world, and he possessed the gift of finding water with the divining rod, or at least he said he did, though I did not give any credence to his claim, as I was a sceptic in those days. One day, while on a farm in the neighbourhood, the owner of the place was complaining about the scarcity of water for his stock, and I said, laughingly, 'Oh, you should have Dr. — here. He would soon find you water.' They wanted to know what the doctor did, and I cut a rod from one of the trees near by, and, holding it like Dr. — used to, I walked a few yards to show the farmer how it was done. Suddenly, to my surprise, I found that I was affected just as the doctor had been, and the stick snapped under the influence that was exerted. This was the first indication I had of possessing the power, and, as I tell you, I had previously laughed at the idea of there being anything in it."

"But I understood that you did not use the rod?"

"Not now. And that is another peculiar story. One day, while working in the orchard, I discovered quite accidentally that I was affected without anything at all in my hands. I had just thrown down a grubber I had been using, and, after the manner of tired people, had yawned with my hands stretched out slightly behind me, when I felt a sudden trembling, and it seemed as if somebody had gripped me by the biceps and was trying to pull me backwards. Nonplussed for the moment, I pondered over the incident, and at last came to the conclusion that it must be the water. Subsequent events proved that it was so. With regard to the rod, my experience has been that it is not always reliable, as it will act in the hands of a hysterical or highly-nervous nature when there is really no water there. Nowadays I never use any rod or stick, but simply walk along with my arms stretched straight down by my side, pointing somewhat to the back. When over water, I feel the sensations that I have just mentioned, and it seems that the greater the body of water the more intense are the sensations set up."

SUGGESTED EXPLANATION.

"Have you formed any idea or theory about this much-discussed power?"

"Yes; and, though I have not previously seen it suggested, I feel convinced that it is the scientific solution of the great disadvantage, that none have been made by men of scientific attainments, but they have all laboured under this great disadvantage, that none of them have been possessed of this peculiar gift or power, or whatever you like to call it, of being sensitive to the influence of underground water. It is known that there is a certain amount of friction in flowing water. Professor Tait, of Edinburgh, has carried out experiments which prove this, and reliable figures can be quoted from his book, but, except to those acquainted with mathematical physics, those figures would convey little information. However, to give the results of his experiments in a popular form, I may say that I gather that the force generated by this friction decreases proportionately with a rise in temperature of the water. A certain volume of water of the temperature of 40 degrees Fahr. would generate a force half as much again as a similar volume of water at 80 degrees Fahr., the velocities of the two currents being the same. Some people say that this force is magnetic, but I think I have proved that it is not. I have insulated myself by standing on a piece of glass and also on rubber, and still have felt it. I have also experienced it while on horseback. Another experiment tried was with a magnetic needle, which I placed close to me in many different positions while feeling the influence of the water, but the needle was not affected in the slightest. No; I think it is not magnetic. It is some force that is at present unknown. We are always discovering something new in the scientific world, some new forces—the Rontgen Rays, for example—and I am convinced that this power of finding water is explainable on a scientific basis, and upon that alone. You are aware that all currents, magnetic or electrical, must complete a circuit. As illustrations, the return circuits in connection with the tramways and the telephone may be mentioned. Now, my theory is that the friction of the running water, or, rather, living water, under the ground, sets up an energy which is not all used up in raising the temperature of the water, but comes up through the ground, and, finding me a good 'conductor,' flows through my body, and seeks to re-enter the earth by way of my arms, and so complete the circuit. I think that this is proved by the fact that when I stand over stagnant water—a well, for instance, in some cases—there is not the slightest effect on me."

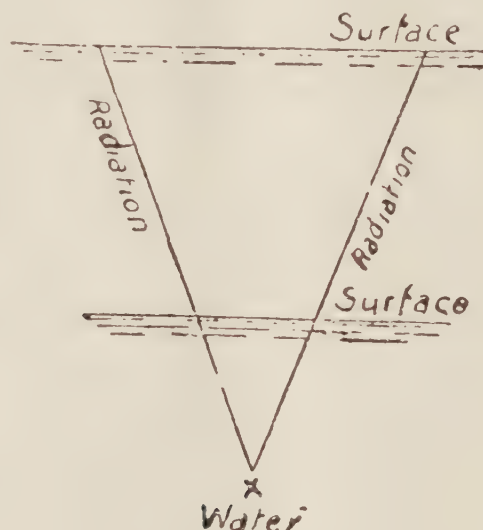
Mr. Mason was asked if he had any means of arriving at the probable depth the water would be found after he had located it.

"No," was his reply, "I must confess that I cannot tell, except in country where I have located a lot of different spots, as at Papatoetoe, and there it is only by analogy, of course. However, I think it probable that there is some way of arriving at a solution, and am now working on the matter in conjunction with a mathematical friend of mine. It seems to me that there may be some relation between the width of surface of ground over which the force is felt and the depth from which the force comes. Let me explain. If it is not at a great depth from the surface, it will not radiate over much ground; but if it is situated at a considerable depth

it will have time to radiate fan-like over a proportionately greater area of ground. This is only a supposition, but it seems to me there is something in it."

Mr. Mason then gave demonstrations of the work, and indicated several spots on his own property where water existed, and also went over the ground across the road where the city council was boring for a supply for the abattoirs—a matter which is again referred to later on. He simply walks along with his arms by his side, his hands pointing somewhat behind, and when he comes on to ground over water he is seized with a trembling in the hands and arms, and the body bends as though he were being forced down by pressure on his two shoulders, till he stands on tiptoe. In some places the effect on him is more marked than in others—presumably owing to a greater or less body of water. If one holds Mr. Mason's wrist while his body is undergoing this contortion, one can feel a sensation not unlike that received from one of those penny-in-the-slot electrical contrivances which are so popular at fairs. Asked if he felt any after effects, Mr. Mason said there was a strained feeling in the muscles of the legs after a big day—He has located over thirty spots on some days—and he could not sleep the night after, but experienced nothing unusual beyond that; and, if he found one or two places only, he felt no inconvenience whatever. It is only when he stretches his arms down in the manner referred to that he can tell when he is over water; and, taking this in conjunction with the fact that those who use the rod must naturally exert a certain amount of force to hold it, one comes to the conclusion that there must be a certain rigidity in the muscles of the upper part of the body before the finder answers to the force generated by the running water.

Mr. Mason believes that there is some connection between the width of the ground over which he feels the sensations set up by the water and the depth at which one may get the water. Take, for instance, the lower line marked "surface" in the diagram. If he can be affected over an area of, say, 3 yards, and the water is tapped at 50 ft., then if he be affected over a greater area, as in the second line marked "surface," the depth at which this water will be found will be so much deeper in proportion. Of course, these figures are purely supposititious.



Some very interesting phenomena are met with now and again in the course of the work. While a bore was being put down at Mangere, the men, after going through scoria for a considerable distance, came across a buried tree (which was afterwards proved to be kauri), and struck a grand flow of water. Many, many centuries ago there must have been a forest there which was buried by some eruption, all the country round about being volcanic. At Mount Wellington, while looking for water for the road board, Mr. Mason found an enormous body of water right in the middle of the scoria pit which is now being worked, and that hundreds of small streams radiated from this centre all round the mountain. His investigations also proved to him that Lake St. John—about whose source there have been frequent discussions—was fed from Mount Wellington, as he traced the course of the underground streams from one to the other. On one occasion Mr. Mason located water for a man in the Waikato, and heard no more about it till one day a messenger came asking advice, as they were in difficulties with the bore. Water had come in intermittently when they had reached a depth of 184 ft., but they had gone down 350 ft. without success; and, as it was getting beyond their means, would Mr. Mason tell them what to do? He replied that there was evidently some obstruction at the 184 ft., and advised putting in a charge and blasting at that spot. The man was canny, and did not like to blow away all the work of weeks, so he put in a charge at the bottom of the bore. No result. He put in another higher up. Still no result. Finally, he exploded a charge at 184 ft., and the water at once came in with a splendid flow.

Entomology.

CANE GRUB INVESTIGATIONS.

The General Superintendent of the Bureau of Sugar Experiment Stations has received the following report upon Cane Grub Investigations from Dr. Illingworth, entomologist of the bureau:—

The seasons are being turned upside down in North Queensland. The rains, delaying in starting, have certainly made up for lost time by the continued downpour of the past month. Unfortunately, the ground was so saturated that the cane has made little advance; and it is still several months behind its usual size. As is usually the case, the activities of the grubs were not so noticeable while the soil was wet, but the effect at Greenhills was startling, once the rains ceased. Within four days the whole infested area yellowed, and, in places, the leaves turned brown, giving the appearance that fire had scorched them. Furthermore, the end is not yet; the large third-stage grubs are not nearly through feeding. Usually they go deep into the soil to hibernate before the cold nights of May begin; but they were so late in hatching this season, due to the delayed rains, that they must feed for several weeks yet in order to store up sufficient fat to last them during the long hibernating period. It is approximately six months before they change to beetles and emerge to begin feeding again.

A recent visit to the Babinda area, which is one of the most humid in the North, was very satisfactory. I have not seen finer cane this season. Situated in the heart of the scrub, this newly-cleared district is virgin land; and with the copious rainfall, which began last season three months earlier than in the vicinity of our station, the cane has made steady advance. White grubs have not gotten a foothold there yet, though the Beetle Borer (*Rhabdocnemis obscura*, Boisd.) is a serious pest, and is spreading very rapidly. With the heavy crops of rapidly growing and often fallen cane, the conditions there are most excellent for the quick multiplication and spread of this pest.

Fortunately, the Tachinid parasites are still available at Mossman, where these flies are doing much to hold the pest in check. As I have indicated in former reports, I have made several minor attempts to introduce the flies into other districts; and several colonies of the parasites have been liberated at Babinda. Nevertheless, I have not yet been able to find these friendly insects established in the fields where they were liberated. With the assistance of the Cairns Canegrowers' Association, I am now making a more extensive effort to establish these parasites here. A large breeding cage has been constructed at the station, along the lines of those which I used successfully in Fiji, and a fresh supply of the flies has been brought from Mossman. The difficulty just now, however, is to secure sufficient borer grubs for the flies to work upon. Several hundred per week are required for successful breeding operations, and these are difficult to secure while the cane is standing. As soon as cutting begins—next month—it will be an easy matter to get all the grubs I need, and I hope then to be able to distribute larger colonies to our principal infested areas. From this new supply I have already liberated another colony at Blackwell's farm, near the river, where the crop is heavy and the borers again plentiful.

Possibly when the cane is cut we will be able to find that the parasites are essential in some of the fields where colonies were liberated last season.

Lepidiota albohirta at Greenhills.—As I intimated in last report, it was the end of April before all the grubs changed to the third or final stage; and even now (15th May) most of them are far from maturity. Nevertheless, the fields in the infested area are already a wreck, and the limits of this area are considerably extended—fully a quarter of a mile more than usual.

In a former report I called attention to the value of poultry, which was apparently responsible for the control of the pest in the vicinity of the quarters. All the fowls, however, were disposed of before the flight of the beetles this season; so I have looked forward with interest to note the result upon the crop. The area, several chains in length, which was formerly immune, is now thoroughly infested; all the cane is yellow and drying up. It would appear that the fowls are able to do this valuable service because of the great numbers of egg-laden beetles which they destroy, when the females fly to the cane in the early morning to oviposit.

Several hundred acres of the most fertile and beautiful soil have been thrown out of cultivation on this estate this season because of the devastation of this terrible pest. It is interesting to remark that during the past five years the present owners of the lease have sunk £29,000 in a continued attempt to produce a paying crop on this infested estate of approximately 1,000 acres of cultivated land. It is enough to make one heart-sick to view the wreck of the crop, when one considers all the work and expense that have been put into it.

As has been suggested, there may be some value in having fields thrown out of cultivation for a time. In some cases such fields have produced well when planted again, for the grubs do not always reappear at once. Recently, when I noticed an abundance of the parasitic wasps (*Campsomeris* and *Scolia* species) feeding in the pink flowers of the burr which now covers the uncultivated fields, it occurred to me that this might be an explanation. These wasps normally must go far from the cane areas to find nectar-bearing flowers, and probably few of them ever get back to perform their friendly services. With nectar abundant near the fields, the wasps congregate in such numbers that they should have a very beneficial effect in reducing the grubs. It will be recalled that I have suggested, in earlier reports, the planting of the nectar-bearing shrubs, &c., along the headlands or in the hedgerows—anywhere that there is waste land—to serve this purpose.

ARSENIC FOR GRUB CONTROL.

As I suspected last month, the placing of arsenic in furrows on either side of the stools has proved absolutely worthless, as far as controlling the grubs is concerned. I have already explained that this is probably due to the habit of the beetles. When flying to the cane to oviposit, the females alight on the canestalks and rest for a considerable period, before proceeding downward directly into the heart of the stool; the cluster of eggs being deposited in a well-formed chamber, where, in the case of ratoons, it is not possible to reach them by cultivation. Then, too, under the drought conditions which we experienced early in the season, the young grubs do not migrate sufficiently to come into the poisoned area of soil at the edges of the stools.

I have extensive experiments started to determine a satisfactory method of applying the arsenic, and, also, to find just what quantity of the poison is necessary. I am confident that with another successful growing season some definite results may be accomplished.

DESTRUCTION OF FEEDING TREES.

The experiment, which I have under way at Greenhills, is not yet extensive enough for very conclusive results. Nevertheless, we are apparently going to get considerable profit on the cost of clearing. I will be able to say more definitely within a few weeks, when the devastation by the grubs is finished for the season.

DOTICUS SP. (D. PESTILENS?) ATTACKING GRANADILLAS IN QUEENSLAND.

By EDMUND JARVIS, Assistant State Entomologist.

PAST HISTORY.

The first record of an Anthribid beetle of the above genus proving injurious to cultivated fruits in Australia was, I believe, in 1889, when several specimens of this little weevil, together with a quantity of shrunken apples, were sent to Mr. C. French, senr., F.L.S., who at that time had been recently appointed Government Entomologist of Victoria.* Mr. Oliff, to whom he submitted this apple-beetle for identification, finding it to be new to science, gave it the name of *Doticus pestilens*.

“The fruit,” says Mr. French, “when attacked by the grub of this beetle, will remain for about a month before it shows any decided signs of shrivelling, when the apples wither and dry up.”

* “Handbook of the Destructive Insects of Victoria”; French. Part I., p. 83.

The grub is said to perforate such fruit until reaching the centre, where it undergoes the closing stages of its metamorphosis, finally emerging as a beetle in time to damage the early crop.

It may interest Stanthorpe apple-growers to learn that the varieties found to be attacked first in Victoria were "Reinette du Canada," "Emperor Alexandria," and "Winter Majetin."

More recently (1910 to 11) the occurrence of *Doticus* was noticed, in various orchards close to Brisbane, on the stems and fruit of papaws; but, although regarded with suspicion, the beetles were not found directly associated with plant injury of any kind.

In 1914, however, the writer† bred a species of *Doticus* from green bananas, the pupæ of which were situated in the ends of fingers that had been bored in the first instance by larvæ of *Heteromicta latro*—a Paralid moth which breeds normally in flower-stalks of grass trees; so in this case the former was probably a secondary insect and perhaps attracted by the injured semi-dry condition of the fruit pulp.

OCCURRENCE IN UNRIPE GRANADILLAS.

Whilst studying some minor pests of the granadilla at Meringa, near Cairns, in 1919, a coleopterous larva was found by the writer inhabiting a hole made in the stem-end of a green fruit, under the dried corolla, and filled in with pellets of dejecta.

In order to make sure that it was a primary pest, this grub was transferred (22nd June) to a green perfectly sound granadilla fruit, enclosed in a suitable cage, and when examined three days later had again tunnelled under the rind and covered itself with a mat formed of excretory matter. Upon removing this covering, it was found lying in a cavity with smooth vertical sides about a quarter of an inch deep; and when looked at a week later (2nd July), it had once more sealed the top of this cell with a roofing of similar material, but hardened by the application of some special fluid to a firm consistency, under cover of which transformation to the pupal stage had taken place.

The pupa was of the usual coleopterous form, and at first milky-white; but by the end of a fortnight the outer portions of the elytra had turned light blue, darker at apex, and the eyes and mandibles deep-brown. The beetle emerged four days later (20th July), when it was then seen to be a species of *Doticus*.

DESCRIPTION OF BEETLE.

About a quarter of an inch long, of humped-up weevil-like form, and a uniform dark reddish-brown colour. Legs long, particularly the front pair, which have unusually large thickened tarsi. From the basal portion of wing-cases arise two dorsal, tuft-like protruberances; and the whole insect is covered with light reddish down.

This beetle, which generally drops quickly from a plant when alarmed, flies with great agility during the heat of the day, and has a curious habit of jumping.

It will sometimes enter houses, attracted by the aroma arising from papaws, granadillas, &c., that have been picked for consumption; and on such occasions may be found resting on the fruit or crawling over it.

Froggatt states that *D. pestilens* has a habit of laying its eggs in dried apples "that are left over the season upon the trees"; and that in its native state it breeds in the large vegetable galls found on our wattle trees.

Its occurrence in juicy green fruit of the granadilla, in the much firmer tissue of galls containing very little moisture, and finally in comparatively dry, dead fruit appears rather remarkable, and is, I think, worth recording.

† "A New Fruit-boring Caterpillar of Bananas, occurring at Tweed Heads (*Heteromicta latro*)."
"Queensland Agricultural Journal," Brisbane, Ap. 1914, pp. 280-284, 1 plate.

General Notes.

TRAPPING OF OPOSSUMS.

Many representations having been made to the Minister for Agriculture and Stock concerning the interference, through drought and other causes, with the opportunities of the open opossum trapping season, it has been decided by the Governor in Council that the season will be extended until the 31st July next. This extension does not in any way effect native bears, which are wholly protected during this year.

TANNING HOG SKINS.

AMERICAN METHOD.

Of late, we have had several inquiries as to the proper method of tanning pig skins.

Hog skins make very nice leather when they are properly tanned. They are usually very greasy, and have numerous holes in them. It is very important that the tanner handles the skins carefully, so as not to increase the number of holes; and the skins must be degreased right at the start, as they will cause trouble all the way through.

The skins should be worked before they are soaked, and as much of the grease as possible must be scraped out. After the skins have been scraped out dry, they should be washed in warm sal soda water, and then worked and scraped to get the dissolved grease out. The soda solution is made by dissolving 5 lb. of sal soda in a barrel of water of about 95 degrees. The skins are put into this water, and left there about one minute; they are then put on the beam, and scraped and worked, and the dissolved grease will flow out. After this has been done at least twice, the skins should be washed in soda solution to free them from adhering grease, and then soaked for twelve to twenty-four hours in cold water. The unhairing is accomplished most readily in a solution of sulphide of sodium or patented depilatory. Fleshing should be done before the skins are unhaired.

DEPILATORIES.

A suitable depilatory is made by dissolving 10 lb. of depilatory in each 7 gallons of water in the vat; the skins are then put into the solution and stirred about for thirty-six hours, more or less, or until the hair is dissolved and the skins are ready for the lime. Wash the hair off, and then lime the skins in weak, white lime for one day; and then transfer them to stronger lime, or make the first lime stronger. From two to four days are usually required by the liming process, according to the thickness of the skins and the strength of the lime. The lime dissolves the remaining grease, and the bathing and washing remove it. A bran bath is good for drenching the skins: 50 lb. of bran soaked in warm water until it is sour and then stirred into 700 gallons of water makes a good drench for the skins; 10 lb. of sulphuric acid should be added to the drench, and the skins stirred about in the liquor for several hours until they are soft and clean.

The next work is fine hairing, and the skins should be worked out over a beam; and all the lime, dirt, and oil should be removed on the flesh side, and the skins are then ready to be scudded upon the grain. This work must be carefully done so as not to damage the grain. All the dirt and fine hairs should be removed from the grain; the skins then rinsed in warm water, and they are then ready to be tanned. On account of their porous nature, the skins absorb the tan very rapidly. Hemlock extract is the cheapest tanning material that can be used; quebracho extract tans the skins with a fine, natural grain; and a combination of the two also makes good leather.

THE TANNING PROCESS.

A paddle vat is the best to do the tanning in, as a drum is apt to tear the skins. When hemlock is used, the skins are kept in the liquor until they are struck through, the liquor being strengthened twice a day. About eight days are required to do the tanning. After they are tanned, the skins should be bleached and drummed in sumac, then washed, struck out, oiled lightly, and dried. Dampen the dry skins, and shave those that need it. Have the skins moist and soft and give them fat liquor made of oil, soap, and degreas; give considerably less fat liquor than calf skins, and then dry the skins again. If the skins are to be coloured, moisten them with warm water, and clear the grain with borax and sulphuric acid or any other good bleaching process, and then mill in sumac again; rinse the leather, and colour it in a drum the desired shade; rinse the skins again; oil the grain with cod oil, and dry the skins again. Staking and finishing complete the work, and the skins are ready for use.

TANNING BATHS.

To tan with quebracho, make up the first tanning bath by adding dissolved quebracho extract to water in the paddle vat to make a 4-degrees liquor. To each 100 gallons of liquor add $1\frac{1}{2}$ lb. of alum and 4 lb. of salt, and plunge the liquor well. Process the skins in this liquor for thirty-six hours, or until they have assumed a light oak colour; then place them in the second bath. This is simply a clear quebracho liquor of 6 degrees. Paddle the skins in this liquor thirty-six hours; then strengthen the liquor to 10 degrees; and in about two days the skins will be completely tanned. Drum the skins in sumac; oil the grain with neatsfoot oil, and hang the skins up to dry or tack them on frames. The dry skins can then be moistened, coloured, and finished. They can also be bleached and finished without being coloured. Hemlock combined with quebracho makes a good tannage. For inner-soiling, the skins are oiled with a combination of fish and mineral oil, and are finished on the rolling machine, which makes them smooth and firm. It is of benefit to the leather to mill the skins in a lactic acid solution before tanning them; it clears the grain.—“Indian Trade Journal.”

SOCIETIES, SHOW DATES, ETC.

CABOOLTURE.—Caboolture Pastoral, Agricultural, and Industrial Society, Secretary D. J. Collins. Show dates: 15th and 16th July next.

CHARTERS TOWERS.—Towers Annual Show will take place on the 17th and 18th July, 1920. Secretary, G. Urquhart.

INGHAM.—Herbert River Pastoral and Agricultural Association. Secretary, J. W. Cartwright. Show dates, 20th and 21st August.

NORTH PINE.—Pine River Agricultural, Horticultural, and Industrial Association, Secretary Geo. Armstrong. Show dates: 3rd and 4th September.

POMONA.—Noosa Agricultural, Horticultural, and Industrial Society. Secretary, N. J. Mackinnon. Show dates, 25th and 26th November, 1920.

PROSERPINE.—The Bowen-Proserpine Tobacco Growers' Association, Secretary W. F. Jochheim.

RAVENSHOE.—Ravenshoe Show Association. Secretary, R. Anderson. Show dates, 13th and 14th October.

LONDON QUOTATIONS.

COTTON.—25d. to 44d. per lb.; Rubber, Para, 2s. 4½d.; Plantation, 2s. 0½d. per lb.; Linseed Oil, £91.

The Markets.

PRICES OF FARM PRODUCE IN THE BRISBANE MARKETS FOR JUNE, 1920.

Article.								JUNE.
								Prices.
Bacon	...	...	...	...	...	...	lb.	1s. 5d.
Bran	...	...	...	...	...	...	ton	£19
Broom Millet	...	...	...	...	...	...	"	£15 to £55
Broom Millet (Sydney)	...	...	...	...	...	...	"	£40 to £50
Butter (First Grade)	...	...	...	...	...	...	cwt.	228s. 8d.
Chaff, Lucerne	...	...	...	...	...	...	ton	£17 5s.
Chaff, Mixed	...	...	...	...	...	...	"	£14 to £15
Chaff, Oaten	...	...	...	...	...	...	"	£15 10s.
Chaff, Wheaten	...	...	...	...	...	...	"	£15 to £16
Chaff, Panicum	...	...	...	...	...	...	"	£12 10s. to £13 10s.
Cheese	...	...	...	...	...	...	lb.	1s. 4d. to 1s. 7d.
Flour	...	...	...	...	...	...	ton	£19 10s.
Hams	...	...	...	...	...	...	lb.	1s. 8d. to 1s. 10½d.
Hay, Lucerne	...	...	...	...	...	...	ton	£13 10s. to £14
Hay, Oaten	...	...	...	...	...	...	"	£18
Honey	...	...	...	...	...	...	lb.	6½d.
Maize	...	...	...	...	...	...	bush.	9s. 10d. to 11s.
Oats	...	...	...	...	...	...	"	...
Onions	...	...	...	...	...	...	ton	£13 to £16.
Peanuts	...	...	...	...	...	...	lb.	6d. to 10½d.
Pollard	...	...	...	...	...	...	ton	£10
Potatoes	...	...	...	...	...	...	"	£16 to £17
Potatoes (Sweet)	...	...	...	...	...	...	"	£6 to £7
Pumpkins (Cattle)	...	...	...	...	...	...	"	£6 to £8 10s.
Turnips (Swede)	...	...	...	...	...	...	"	...
Eggs	...	...	...	...	...	...	doz.	1s. 11d. to 2s. 6d.
Fowls	...	...	...	...	...	...	per pair	5s. to 7s. 6d.
Ducks, English	...	...	...	...	...	...	"	5s. 6d. to 6s.
Ducks, Muscovy	...	...	...	...	...	...	"	5s. to 7s.
Geese	...	...	...	...	...	...	"	10s. to 12s.
Turkeys (Hens)	...	...	...	...	...	...	"	10s. to 14s.
Turkeys (Gobblers)	...	...	...	...	...	...	"	£1 1s. to £2.
Wheat	...	...	...	...	...	...	bush.	11s. 1d.

VEGETABLES—TURBOT STREET MARKETS.

Beans, per sugar bag	...	...	...	...	...	...	6s. 6d. to 20s.
Beetroot, per dozen bunches	...	...	...	...	...	...	9d. to 1s. 6d.
Cabbages, per dozen	...	...	...	...	...	...	17s. 6d. to 30s.
Cauliflowers, per dozen	...	...	...	...	...	...	15s. to 28s.
Carrots, per dozen bunches	...	...	...	...	...	...	1s. 9d. to 3s.
Cucumbers, per dozen	...	...	...	...	...	...	6d. to 2s.
Lettuce, per dozen	...	...	...	...	...	...	9d. to 1s.
Marrows, per dozen	...	...	...	...	...	...	3s. 6d. to 1 ⁰ s.
Peas, per sugar bag	...	...	...	...	...	...	11s. to 19s.
Potatoes (Sweet), per sugar bag	...	...	...	...	...	...	3s. 6d. to 8s.
Pumpkins (table), per sack	...	...	...	...	...	...	9s. to 12s.
Tomatoes, per quarter case	...	...	...	...	...	...	2s. to 5s.
Turnips (Swede), per sugar bag	...	...	...	...	...	...	1s. 6d. to 2s.

SOUTHERN FRUIT MARKETS.

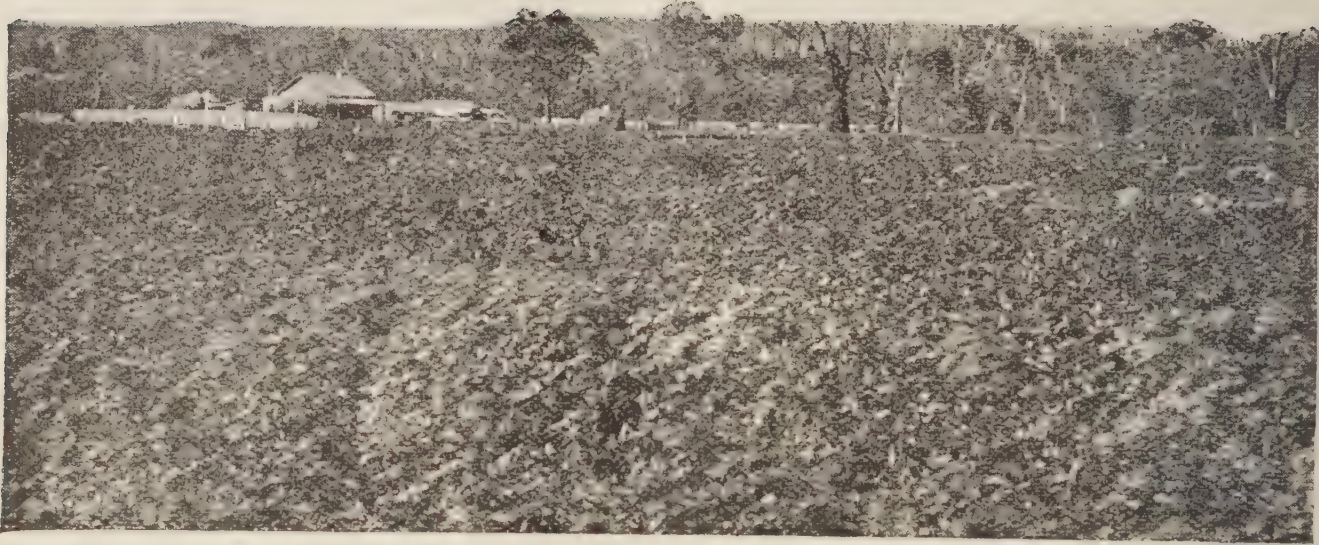
Article.					JUNE.
					Prices.
Bananas (Queensland), per double case ...	...	...	...	...	25s. to 30s.
Bananas (Tweed River), per double case ...	...	...	...	...	15s.
Bananas (Fiji) per double case ...	...	...	...	...	...
Lemons, per bushel case ...	...	...	...	...	6s. to 9s.
Mandarins, per bushel case ...	...	...	...	...	6s. to 13s.
Oranges (Navel), per bushel case ...	...	...	...	...	7s. to 12s.
Pineapples (Queens), per double case ...	...	...	...	...	10s. to 22s.
Pineapples (Ripley), per double case ...	...	...	...	...	15s. to 18s.
Pineapples (common), per dozen ...	...	...	...	...	5d. to 9d.
Tomatoes, per quarter case ...	...	...	...	...	2s. to 5s.

PRICES OF FRUIT—TURBOT STREET MARKETS.

Apples, Eating, per bushel case ...	...	...	...	...	9s. to 15s.
Apples, Cooking, per bushel case ...	...	...	...	...	9s. to 12s. 6d.
Bananas (Cavendish), per dozen ...	...	...	...	...	5d. to 1s.
Bananas (Sugar), per dozen ...	...	...	...	...	5d. to 10d.
Citrons, per cwt. ...	...	...	...	...	15s. to 16s.
Cocoanuts, per sack ...	...	...	...	...	£1 5s.
Custard Apples, per half bushel case ...	...	...	...	...	5s. to 8s.
Grapes, per lb. ...	...	...	...	...	...
Lemons (Lisbon), per half bushel case ...	...	...	...	...	4s. 6d. to 11s.
Mandarins, per case ...	...	...	...	...	12s. to 19s. 6d.
Oranges (Navel), per case ...	...	...	...	...	12s. to 13s. 6d.
Oranges, per half bushel case ...	...	...	...	...	10s. to 19s.
Papaw Apples, per case ...	...	...	...	...	6s. to 10s.
Passion Fruit, per half bushel case ...	...	...	...	...	3s. to 8s.
Peaches, per quarter case ...	...	...	...	...	...
Pears, per quarter case ...	...	...	...	...	...
Pineapples (rough), per case ...	...	...	...	...	12s. to 15s.
Pineapples (smooth), per case ...	...	...	...	...	10s. to 15s. 6d.
Pineapples (Ripley), per case ...	...	...	...	...	12s. to 15s.
Rosellas, per sugar-bag ...	...	...	...	...	6s. to 9s.
Tomatoes (prime), per quarter case ...	...	...	...	...	1s. to 8s.

TOP PRICES, ENOGGERA YARDS, MAY, 1920.

Animal.					MAY.
					Prices.
Bullocks ...	...	...	...	...	£18 5s. to £22 15s.
Bullocks (Single) ...	...	...	...	...	...
Cows ...	...	...	...	...	£13 10s. to £16 7s. 6d.
Cows (Single) ...	...	...	...	...	...
Merino Wethers ...	...	...	...	...	35s. 9d.
Crossbred Wethers ...	...	...	...	...	36s. 9d.
Merino Ewes ...	...	...	...	...	30s.
Crossbred Ewes ...	...	...	...	...	40s.
Lambs ...	...	...	...	...	31s. 3d.
Pigs (Backfatters) ...	...	...	...	...	...
Pigs (Light Bacon) ...	...	...	...	...	...
Pigs (Porkers) ...	...	...	...	...	73s.



A Field of Giant Kangaroo Rape

JUST ARRIVED!

Giant Kangaroo

*The Food
for
SHEEP!*

RAPE

*The Food
for
SHEEP!*

A VALUABLE WINTER CROP for pasturing Sheep—will fatten three more to the acre than any other variety. Easily cultivated. Strong rapid grower, producing an abundance of highly nutritious green feed, greatly relished by all stock; a long strong taproot enables it to stand long periods of drought. Sow 4 to 6 lbs. per acre in drills, or 8 to 12 lbs per acre broadcast.

Now Available for Immediate Delivery.
1/6 lb.; 150/- cwt. f.o.b. Melbourne.

LAW, SOMNER Pty. Ltd.

British and Colonial Seed Merchants,

139-141 Swanston Street, MELBOURNE.

Established 1850.

Tel. Central 729.

Write for our Special Farm Circular
Post Free on request.

Farm and Garden Notes for August.

This and the following two months are about the busiest periods of the year so far as work in the field is concerned; and the more activity now displayed in getting in the summer crops, the richer will be the reward at harvest time. Potatoes should be planted, taking care to select only good sound seed that has sprouted. This will ensure an even crop. Yams, arrowroot, ginger, sisal hemp, cotton, and sugar-cane may now be planted. Sow maize for an early crop. If the seed of prolific varieties is regularly saved, in the end it will not be surprising to find from four to six cobs on each stalk. This has been the experience in America, where the selecting of seeds has been reduced to a fine art.

In choosing maize for seed, select the large, well-filled, flat grains. It has been shown that, by constantly selecting seed from prolific plants, as many as five and six cobs of maize can be produced on each stalk all over a field. A change of seed from another district is also beneficial. Sow pumpkins, either amongst the maize or separately, if you have the ground to spare. Swede turnips, clover, and lucerne may be sown, but they will have to contend with weeds which will begin to vigorously assert themselves as the weather gets warmer; therefore keep the hoe and cultivator constantly going in fine weather. Tobacco may be sown during this month. If vines are available, sweet potatoes may be planted towards the end of the month. In this case also it is advisable to avoid too frequent planting of cuttings from the old vines, and to obtain cuttings from other districts. If grasses have not yet been sown, there is still time to do so, if the work be taken in hand at once. Sugar-cane crushing will now be in full swing, and all frosted cane in the Southern district should be put through the rollers first. Plough out old canes, and get the land in order for replanting. Worn out sugar lands in the Central and Northern districts if not intended to be manured and replanted will bear excellent crops of sisal hemp. Rice and coffee should already have been harvested in the North. The picking of Liberian coffee, however, only begins this month. Collect divi-divi pods. Orange-trees will be in blossom, and coffee-trees in bloom for the second time. As this is generally a dry month in the North, little can be done in the way of planting.

Kitchen Garden.—Nearly all spring and summer crops can now be planted. Here is a list of seeds and roots to be sown which will keep the market gardeners busy for some time: Carrots, parsnip, turnip, beet, lettuce, endive, salsify, radish, rhubarb, asparagus, Jerusalem artichoke, French beans, runner beans of all kinds, peas, parsley, tomato, egg-plant, sea-kale, cucumber, melon, pumpkin, globe artichokes. Set out any cabbage plants and kohlrabi that are ready. Towards the end of the month plant out tomatoes, melons, cucumbers, &c., which have been raised under cover. Support peas by sticks or wire-netting. Pinch off the tops of broad beans as they come into flower to make the beans set. Plough or dig up old cauliflower and cabbage beds, and let them lie in the rough for a month before replanting, so that the soil may get the benefit of the sun and air. Top dressing, where vegetables have been planted out, with fine stable manure has a most beneficial effect on their growth, as it furnishes a mulch as well as supplies of plant food.

Flower Garden.—All the roses should have been pruned some time ago, but do not forget to look over them occasionally, and encourage them in the way they should go by rubbing off any shoots which tend to grow towards the centre. Where there is a fine young shoot growing in the right direction, cut off the old parent branch which it will replace. If this work is done gradually it will save a great deal of hacking and sawing when next pruning season arrives. Trim and repair the lawns. Plant out antirrhinums (snapdragon), pansies, hollyhocks, verbenas, petunias, &c. Sow zinnias, amaranthus, balsam, chrysanthemum, marigolds, cosmos, coxcombs, phloxes, sweet peas, lupins; and plant gladiolus tuberoses, amaryllis, pancratium, ismene, crinums, belladonna, lily, and other bulbs. In the case of dahlias, however, it will be better to place them in some warm moist spot, where they will start gently and be ready to plant out in a month or two. It must be remembered that this is the driest of our months. During thirty-eight years the average number of rainy days in August was seven, and the mean average rainfall 2.63 in., and for September 2.07 in., increasing gradually to a rainfall of 7.69 in. in February.

Orchard Notes for August.

THE SOUTHERN COAST DISTRICTS.

The remarks that have appeared in these notes during the last few months respecting the handling and marketing of Citrus Fruits apply equally to the present month. The bulk of the fruit, with the exception of the latest ripening varieties in the latest districts, is now fully ripe, and should be marketed as soon as possible, so that the orchards can be got into thorough order for the Spring growth. All heavy pruning should be completed previous to the rise in the sap; and where Winter spraying is required, and has not yet been carried out, no time should be lost in giving the trunks, main branches, and inside of the trees generally a thorough dressing with the lime and sulphur wash.

Where there are inferior sorts of seedling citrus trees growing, it is advisable to head same hard back, leaving only the main trunk and four or five well balanced main branches cut off at about 2 ft. from the trunk. When cut back give a good dressing with the lime and sulphur wash. Trees so treated may either be grafted with good varieties towards the end of the month or early in September; or, if wished, they may be allowed to throw out a number of shoots, which should be thinned out to form a well balanced head, and when large enough should be budded with the desired variety.

Grafting of young stock in nursery, not only citrus but most kinds of deciduous fruits, can be done this month. It comes in useful in the case of stocks that have missed in budding, but for good clean grown stocks I prefer budding.

In the case of working our Seville orange stocks to sweet oranges, grafting is, however, preferable to budding, as the latter method of propagation is frequently a failure. The Seville stock should be cut off at or a little below the surface of the ground. If of small size, a single tongue graft will be sufficient, but if of large size, then the best method is the side graft—two or more grafts being placed in each stock, so as to be certain of one taking. In either case the grafts are tied firmly in place, and the soil should be brought round the graft as high as the top bud. If this is done, there will be few missed, and undesirable Seville stocks can be converted into sweet oranges.

In selecting wood for grafting, take that of the last season's growth that has good full buds and that is well-matured—avoid extra strong, or any poor growths.

Seville oranges make good stocks for lemons. In case it is desirable to work them on to lemons, it is not necessary to graft below ground, as in the case of the sweet orange, but the stock can be treated in the same manner as that recommended in the case of inferior oranges—viz., to head hard back, and bud on the young shoots.

Where orchards have not already been so treated, they should now be ploughed so as to break up the crust that has been formed on the surface during the gathering of the crop, and to bury all weeds and trash. When ploughed, do not let the soil remain in a rough, lumpy condition, but get it into a fine tilth, so that it is in a good condition to retain moisture for the tree's use during Spring. This is a very important matter, as Spring is our most trying time, and the failure to conserve moisture then means a failure in the fruit crop, to a greater or lesser extent.

Where necessary, quickly-acting manures can be applied now. In the case of orchards, they should be distributed broadcast over the land, and be harrowed or cultivated in; but, in the case of pines, they should be placed on each side of the row, and be worked well into the soil.

The marketing of pines, especially smooths, will occupy growers' attention, and where it is proposed to extend the plantations the ground should be got ready, so as to have it in the best possible condition for planting, as I am satisfied that the thorough preparation of the land prior to planting pines is money very well spent.

The pruning of all grape vines should be completed, and new plantings can be made towards the end of the month. Obtain well-matured, healthy cuttings, and plant them in well and deeply worked land, leaving the top bud level with the surface of the ground, instead of leaving 6 or 7 in. of the cutting out of the ground to dry out, as is often done. You only want one strong shoot from your cutting, and from this one shoot you can make any shaped vine you want. Just as the buds of the vines begin to swell, but before they burst, all varieties that are subject to black spot should be dressed with the sulphuric acid solution—viz., three-quarters of a pint of commercial sulphuric acid to one gallon of water; or, if preferred, this mixture can be used instead—viz., dissolve 5 lb. of sulphate of iron (pure copperas) in one gallon of water, and when dissolved add to it half a pint of sulphuric acid.

THE TROPICAL COAST DISTRICTS.

Bananas should be increasing in quality and quantity during the month, and though, as a rule, the fruit fly is not very bad at this time of the year, still it is advisable to take every care to keep it in check. No over-ripe fruit should be allowed to lie about in the gardens, and every care should be taken to keep the pest in check when there are only a few to deal with, as, if this is done, it will reduce the numbers of the pest materially later on in the season. The Spring crop of oranges and mandarins will be now ready for marketing in the Cardwell, Tully, Cairns, and Port Douglas districts. For shipping South see that the fruit is thoroughly sweated, as unless the moisture is got rid of out of the skins the fruit will not carry. Should the skins be very full of moisture, then it will be advisable to lay the fruit on boards or slabs in the sun to dry; or if this is not possible, then the skin of the fruit should be artificially dried by placing same in a hot chamber, as the moisture that is in the skin of our Northern-grown citrus fruits must be got rid of before they will carry properly.

Papaws and granadillas should be shipped South, and the markets tested. If carefully packed in cases holding only one layer of fruit, and sent by cold storage, these fruits should reach their destination in good order. Cucumber and tomato shipments will be in full swing from Bowen. Take care to send nothing but the best fruit, and don't pack the tomatoes in too big cases, as tomatoes always sell on their appearance and quality.

THE SOUTHERN AND CENTRAL TABLELANDS.

All fruit-tree pruning should be finished during the month, and all trees should receive their winter spraying of the lime and sulphur wash.

All new planting should be completed, orchards should be ploughed and worked down fine, and everything got ready for Spring.

In the warmer parts, grape-pruning should be completed, and the vines should receive the Winter dressing for black spot. In the Stanthorpe district grape-pruning should be delayed as late as possible, so as to keep the vines back, as it is not early but late grapes that are wanted, and the later you can keep your vines back the better chance they have of escaping Spring frosts.

Towards the end of the month inferior varieties of apples, pears, plums, &c., should be worked out with more desirable kinds; side, tongue, or cleft grafting being used. In the case of peaches, almonds, or nectarines, I prefer to head back and work out by budding on the young growth.

ASTRONOMICAL DATA FOR QUEENSLAND.

TIMES COMPUTED BY D. EGLINTON, F.R.A.S.

TIMES OF SUNRISE AND SUNSET. **AT BRISBANE.**

1920.	MAY.		JUNE.		JULY.		AUGUST.		PHASES OF THE MOON, ECLIPSES, &c. (The times stated are for Queensland, New South Wales, and Victoria).
Date.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.	
1	6.14	5.16	6.31	5.0	6.39	5.3	6.30	5.18	H. M. 3 May ○ Full Moon 11 47 a.m. 11 „ ☾ Last Quarter 3 51 p.m. 18 „ ☿ New Moon 4 24 p.m. 25 „ ☾ First Quarter 7 7 a.m. Apogee on 7th at 6 a.m. Perigee on 19th at 4 p.m. The Moon will be totally eclipsed on the 3rd at midday, but will not be visible in Australia. It will cause a partial eclipse of the Sun on the 18th, visible in parts of Queensland about sunset.
2	6.14	5.15	6.32	5.0	6.40	5.4	6.29	5.19	
3	6.15	5.15	6.33	4.59	6.40	5.4	6.29	5.19	
4	6.15	5.14	6.33	4.59	6.40	5.4	6.28	5.20	
5	6.16	5.14	6.33	4.59	6.40	5.5	6.27	5.20	
6	6.17	5.13	6.34	4.59	6.40	5.5	6.27	5.21	2 June ○ Full Moon 3 18 a.m. 10 „ ☾ Last Quarter 4 58 a.m. 16 „ ☿ New Moon 11 41 p.m. 23 „ ☾ First Quarter 4 49 p.m. Apogee on 3rd at 2.30 p.m. and on 30th at 5 p.m. Perigee on 17th at 1.12 a.m. The Moon will occult Mars and Spica on the 25th, not visible in Australia unfortunately, but on the 28th the occultation of a small star in the Scorpion about 6 p.m. will be an interesting sight in small telescopes and binoculars.
7	6.17	5.12	6.34	4.59	6.40	5.5	6.26	5.21	
8	6.18	5.12	6.34	4.59	6.40	5.6	6.25	5.22	
9	6.18	5.11	6.35	4.59	6.40	5.6	6.24	5.22	
10	6.19	5.10	6.35	4.59	6.40	5.6	6.23	5.23	
11	6.19	5.9	6.35	4.59	6.39	5.7	6.23	5.23	1 July ○ Full Moon 6 41 p.m. 9 „ ☾ Last Quarter 3 5 p.m. 16 „ ☿ New Moon 6 25 a.m. 23 „ ☾ First Quarter 5 20 a.m. 31 „ ○ Full Moon 9 19 a.m. Perigee on 15th at 10.24 a.m. Apogee 28th, 12.24 a.m.
12	6.20	5.8	6.36	5.0	6.39	5.7	6.22	5.24	
13	6.21	5.8	6.36	5.0	6.39	5.8	6.21	5.24	
14	6.21	5.7	6.36	5.0	6.39	5.8	6.20	5.25	
15	6.22	5.6	6.36	5.0	6.38	5.9	6.19	5.26	
16	6.22	5.6	6.37	5.0	6.38	5.9	6.18	5.26	7 Aug. ☾ Last Quarter 10 50 p.m. 14 „ ☿ New Moon 1 44 p.m. 21 „ ☾ First Quarter 8 52 p.m. 29 „ ○ Full Moon 11 3 p.m. Perigee on 12th at 3.48 p.m. Apogee on 24th at 2.36 p.m. On the 8th and 9th of August the planets Venus and Jupiter will appear to be in juxtaposition, but will be too near to the Sun to be seen to much advantage without a telescope or binoculars. They will be about ten degrees south-east of the Sun.
17	6.23	5.5	6.37	5.0	6.38	5.10	6.17	5.27	
18	6.23	5.5	6.38	5.0	6.37	5.10	6.16	5.27	
19	6.24	5.4	6.38	5.0	6.37	5.11	6.16	5.28	
20	6.25	5.4	6.38	5.0	6.36	5.12	6.15	5.28	
21	6.25	5.4	6.39	5.0	6.36	5.12	6.14	5.28	
22	6.26	5.3	6.39	5.0	6.35	5.13	6.13	5.29	
23	6.26	5.3	6.39	5.1	6.35	5.13	6.12	5.29	
24	6.27	5.3	6.39	5.1	6.34	5.14	6.11	5.30	
25	6.28	5.2	6.39	5.2	6.34	5.14	6.10	5.30	
26	6.28	5.2	6.39	5.2	6.33	5.15	6.9	5.30	
27	6.29	5.2	6.39	5.2	6.33	5.15	6.8	5.31	
28	6.29	5.1	6.39	5.3	6.32	5.16	6.7	5.31	
29	6.30	5.1	6.39	5.3	6.32	5.16	6.6	5.32	
30	6.30	5.1	6.39	5.3	6.31	5.17	6.5	5.32	
31	6.31	5.1	...	...	6.31	5.17	6.4	5.33

For places west of Brisbane, but nearly on the same parallel of latitude—27½ degrees S.—add 4 minutes for each degree of longitude. For example, at Toowoomba the sun would rise about 4 minutes later than at Brisbane if it were not for its higher elevation, and at Oontoo (longitude 141 degrees E.) about 48 minutes later.

At St. George, Cunnamulla, and Thargomindah the times of sunrise and sunset will be about 18 m., 30 m., and 38 minutes respectively, later than at Brisbane.

The moonlight nights for each month can best be ascertained by noticing the dates when the moon will be in the first quarter and when full. In the latter case the moon will rise somewhat about the time the sun sets, and the moonlight then extends all through the night; when at the first quarter the moon rises somewhere about six hours before the sun sets, and it is moonlight only till about midnight. After full moon it will be later each evening before it rises, and when in the last quarter it will not generally rise till after midnight.

It must be remembered that the times referred to are only roughly approximate, as the relative positions of the sun and moon vary considerably.

[All the particulars on this page were computed for this Journal, and should not be reproduced without acknowledgment.]

LET BRADSHAW'S INTO YOUR HOME !

IT WILL MEAN EFFICIENCY.

BRADSHAW'S 26:6:26 symbolises proficiency in Shorthand, with ease, in a few weeks—5 easy lessons and Instructions for Speed practice. One boy completed his Theory and was writing slow speed at end of 5½ hours. Ask for Pamphlet P30.

TYPEWRITING—Learn to operate a typewriter. To anyone entering business it is as necessary to know the use of a typewriter as it is to be able to handle a pen. You will have the use of a machine in your home. Shorthand writers should be able to transcribe their notes on the typewriter.

HANDWRITING—So practically is this subject taught that "once bad penmen" write us of their appreciation, and are astonished at the short time it takes to develop a finished style of business handwriting.

ADVERTISING—There is no profession quite as fascinating and inspirational as Advertising. To ladies and gentlemen the Advertising field is broad in its scope. The ability to write good advertisements may be acquired through Bradshaw's.

Salesmanship, Tailoring, Cutting, Designing, Timber Measurement, Mechanical Drawing, Book-keeping, Business Correspondence, and many other subjects can be efficiently **LEARNED by Post.**

There are big opportunities awaiting people who are big enough to see them. A Bradshaw training will give you the knowledge and the vision that meets opportunity halfway.

You can be taught by specialised postal tuition and be made a business success in your leisure time and in your own home.

Write us particulars of your case. We will advise you as to a career.

GET A LETTER AWAY TO-DAY.

BRADSHAW'S BUSINESS
COLLEGE
PTY., LTD.,

244-50 FLINDERS STREET, MELBOURNE, VICTORIA.

RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF MAY IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALLS DURING MAY, 1920 AND 1919, FOR COMPARISON.

Divisions and Stations.	AVERAGE RAINFALL.		TOTAL RAINFALL.		Divisions and Stations.	AVERAGE RAINFALL.		TOTAL RAINFALL.	
	May.	No. of Years' Records.	May, 1920.	May, 1919.		May.	No. of Years' Records.	May, 1920.	May, 1919.
<i>North Coast.</i>					<i>South Coast—continued:</i>				
	In.		In.	In.		In.		In.	In.
Atherton	2·19	19	2·84	4·04	Nambour	5·25	24	2·69	11·41
Cairns	4·52	38	11·78	6·19	Nanango	1·67	38	1·82	2·91
Cardwell	3·62	48	11·36	5·95	Rockhampton ...	1·63	33	1·94	4·88
Cooktown	2·99	44	12·64	6·06	Woodford	3·05	33	3·80	7·69
Herberton	1·68	33	4·62	2·99					
Ingham	3·45	28	12·07	3·95					
Innisfail	11·64	39	29·58	21·74					
Mossman	2·52	12	15·56	4·24					
Townsville	1·34	49	5·27	0·28					
<i>Central Coast.</i>					<i>Darling Downs.</i>				
					Dalby	1·36	50	1·95	2·99
					Emu Vale	1·23	24	2·32	2·59
Ayr	1·14	33	5·57	0·42	Jimbour	1·25	32	1·57	1·54
Bowen	1·35	49	4·48	0·31	Miles	1·65	35	0·52	1·45
Charters Towers ...	0·79	38	3·34	0·52	Stanthorpe	1·98	47	2·20	3·46
Mackay	3·98	49	7·47	9·99	Toowoomba	2·35	48	3·48	4·27
Proserpine	5·30	17	7·89	4·89	Warwick	1·67	33	2·19	2·98
St. Lawrence	1·89	49	4·19	3·00					
<i>South Coast.</i>					<i>Maranoa.</i>				
					Roma	1·55	46	0·35	2·24
Biggenden	1·95	21	1·39	2·66					
Bundaberg	2·83	37	3·01	6·53					
Brisbane	2·93	69	2·02	5·47					
Childers	2·40	25	2·89	2·71					
Crohamburst	5·00	25	5·18	11·41					
Esk	2·19	33	2·41	5·42					
Gayndah	1·61	49	1·86	1·56					
Gympie	3·13	50	1·79	5·85					
Glasshouse M'tains	3·91	12	3·26	10·37					
Kilkivan	2·01	41	2·41	2·99					
Maryborough	3·16	49	3·61	6·35					
					<i>State Farms, &c.</i>				
					Bungeworgorai ...	0·75	6	0·95	1·88
					Gatton College ...	1·88	21	3·26	2·97
					Gindie	1·15	21	0·57	1·49
					Hermitage	1·37	14	2·44	3·40
					Kairi	2·11	6	Nil	4·27
					Sugar Experiment Station, Mackay	3·63	23	7·87	5·94
					Warren	0·93	6	4·61	3·56

NOTE.—The averages have been compiled from official data during the periods indicated; but the totals for May this year, and for the same period of 1919, having been compiled from telegraphic reports are subject to revision.

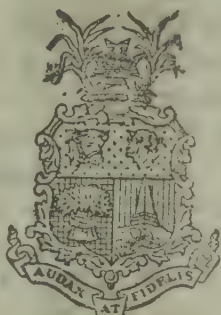
GEORGE G. BOND, State Meteorologist.

Queensland.

Department of Agriculture and Stock.

Volume XIV. ²

AUGUST, 1920.



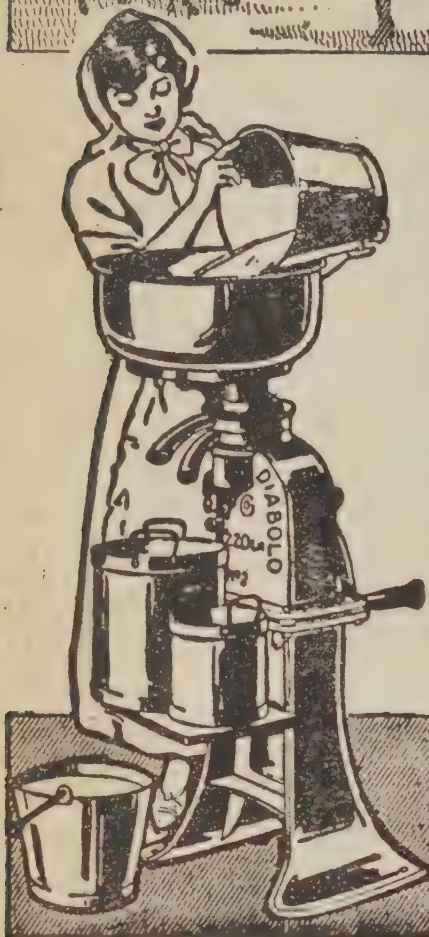
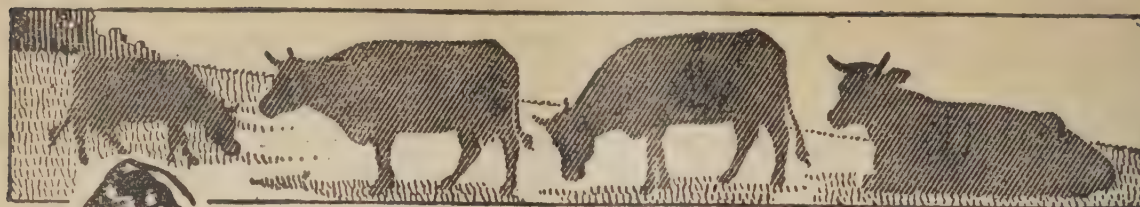
Queensland Agricultural — Journal. —



REGISTERED AT THE GENERAL POST OFFICE, BRISBANE,
FOR TRANSMISSION BY POST AS A NEWSPAPER.

Edited by
A. J. BOYD, F.R.G.S.Q.

Are YOU wasting Cream?



THOUSANDS OF GALLONS of valuable butter-fat are wasted in Australia every year owing to inferior separating. There is enough money lost every year to buy a new "Diabolo Separator" for every dairy farmer in Queensland. The "Diabolo" is the world-wide favourite. It is made of the finest materials, it runs smoothly, is easy to turn, and wonderfully easy to clean. It will pay for itself over and over again. Back up your cows by using a "Diabolo." Have one on 30 days' Free Trial and watch results. Easy to buy—Cash or Terms.

Write to us to-day.

DIABOLO
CREAM SEPARATOR CO.
138-140 CREEK ST BRISBANE

Make YOUR Farm Show a Good Profit This Season!

The First Thing to do in order to achieve this result is—

To Plant Taylor's Seeds

After that it depends upon the weather, etc. But if you plant poor Seed at first, you won't have such a splendid crop as you would if you had planted the best germinating Seed. *Taylor's Seeds are always reliable.*

Recleaned Broad Leaf Hunter River Lucerne Seed

We have just received direct from the Hunter River district of New South Wales a stock of the abovementioned seed. We stock no other variety whatever. Lucerne Seed is going to be scarce and dear, and our advice to you is to **ORDER NOW** if you are thinking of planting now or a little later. Do not delay, or wait until stocks run out. *Order now.*

Fodder Seeds of all Kinds

You can now sow all kinds of fodder crop Seeds, and we mention a few lines of which we have good stocks—Imphee, Ordinary Panicum, White Panicum, Japanese Millet, Sudan Grass, etc. Also Rhodes Grass and Paspalum Seed.

Oats and Barley

Oats and Barley may both be sown this month. We have just landed into our store a fine lot of recleaned Algerian Seed Oats, Also Cape Barley. Both of these lines are going out freely. Prices on application.

Vegetable and Flower Seeds

of every description. Flower Seeds in packets at from 3d. each upwards, also in bulk. Just arrived from Great Britain and America our new stock of Vegetable seeds of all kinds. *Order your's from*

Chas. Taylor & Co., "The Leading Seedsmen"
110-116 Roma St., Brisbane

VOL. XIV., PART 2.]

[AUGUST, 1920.

Registered at the General Post Office for Transmission by Post as a Newspaper.]



THE
QUEENSLAND AGRICULTURAL JOURNAL

ISSUED BY DIRECTION OF

THE HON. THE SECRETARY FOR AGRICULTURE.

EDITED BY A. J. BOYD F.R.G.S.Q.

VOL. XIV. PART 2.

AUGUST.

By Authority:

ANTHONY JAMES CUMMING, GOVERNMENT PRINTER, BRISBANE.

1920

We are Bag Specialists

For Farmers For Farmers For Farmers

Bags for Wheat, Maize, Chaff, Peas, Beans, etc.
Any sort or kind. New or Second Hand.

**For Storekeepers, Meat Exporters, Flour
———Millers, Bacon Curers, etc.———**

All kinds of HESSIAN and CALICO BAGS
———Printed to your own design.———

For Packing, Signwriting, Plastering, etc.
HESSIAN & CALICO all widths & grades.

Joyce Bros. (Q.) Limited,
Stanley Street, South Brisbane.

Sowing the Right Kind of Seed

H. A. PETERSEN Ltd. supply seed that *is* good. They exercise every precaution to guard against impurities, therefore it is the **right** kind of seed to sow.

SEED POTATOES.—Brownell's, Up-to-date, Manisty, Excelsior Blues, Early Carmen. Especially good. Price on application.

LUCERNE.—Best Hunter River, broad leaf, double screened. Price 3/- Special quote for large quantities.

OATS.—Splendid seed. Price, 9/6 bushel.

BARLEY.—Extra Special. Price, 10/- bushel.

RYE.—Extra special. 17/6 bushel.

TARES.—Excellent sample. 32/6 bushel.

MANGOLD WURZELS.—Price, 6/- lb.

SWEDES.—Price, 6/- lb.

RHUBARB ROOTS.—1/- each, 10/- doz. Carriage extra.

COUCH GRASS.—Price on application.

SEED WHEAT.—Price on application.

SEED BARLEY.—Price on application.

**H. A. Petersen
Ltd.,**

*Agricultural
Seedsman,*

**George Street, BRISBANE ;
Also at 244 Queen Street.**



CONTENTS.

	PAGE.		PAGE.
AGRICULTURE—		SCIENCE—	
Productivity of Perennial Cotton Plants (D. Jones)	49	The Eradication of Prickly-pear (W. S. Campbell)	73
Short and Long-stapled Cotton	52	CANE PLANTING IN JAVA	73
The London "Times" and the Cotton Industry	53	NATURAL HISTORY—	
Cotton Proof against Damage by Drought or Rain	54	Flying Foxes (H. Tryon)	74
Cotton Planting	55	POISONING WHITE ANTS	76
To Cotton Growers: Cotton Seed	55	GENERAL NOTES—	
Irrigation of the Woongarra Sugar District, Bundaberg	56	Meggitt Limited	77
Irish Blight (A. H. Benson)	57	London Quotations for July	77
A RAPID EARTH THRUST-BORER	59	Tanning Sheep Skins	77
PASTORAL—		To Combat Red and Black Ants	78
Sheep-penning Device	60	Up-to-date Road Machinery	78
DAIRYING—		Societies, Show Dates, &c.	78
Distinction between the Milking Shorthorn and the Illawarra Shorthorn	61	Productivity of Perennial Cotton Plants	78
Comparative Cost of Cheese and Butter Making	62	ANSWERS TO CORRESPONDENTS	79
THE HORSE—		THE MARKETS—	
War Record of the Suffolk Punch	63	Prices of Farm Produce in the Brisbane Markets for July, 1920	80
POULTRY—		Vegetables—Turbot Street Markets	80
Report on Egg-laying Competition, Queensland Agricultural College, June, 1920	66	Southern Fruit Markets	81
More Muscovy Ducks should be Raised for the Table (R. T. G. Carey)	68	Prices of Fruit—Turbot Street Markets	81
TO PREVENT IRISH BLIGHT IN POTATOES	69	Top Prices, Enoggera Yards, June, 1920	81
BOTANY—		FARM AND GARDEN NOTES FOR SEPTEMBER	83
Note on Variation in the Bark of Two Common Eucalypts (C. T. White, F.L.S.)	70	ORCHARD NOTES FOR SEPTEMBER	84
		ASTRONOMICAL DATA FOR QUEENSLAND	86
		RAINFALL IN THE AGRICULTURAL DISTRICTS	88
		DEPARTMENTAL ANNOUNCEMENTS	XVII.



You paint a house to protect as well as to beautify it—be sure to use a paint that will withstand the elements. A guarantee as to lasting quality goes with every can of

Berger's Paint

(Prepared)

James Campbell & Sons Ltd.
Creek Street, Brisbane,
Distributors for Queensland.

Sold by local agents in most towns

OVERCOAT WEATHER

—and the House of PIKE BROTHERS is splendidly ready to supply OVERCOATS that are full of good new style and superb quality. —

Dark Grey Tweed overcoats, Raglan Sleeves, fashionably made with loose belt right round.

Price, **80/-**

Same quality and shape, but without belt.

Price, **77/6**

Better qualities, and superb qualities at that.

Price, **5, 6, & 7** guineas.



—and now for these very warm



Coat Sweaters

All-wool coat sweaters, Brown and Grey shades, showing "V" front or button to throat with collar. Sizes, 34 to 44. Exceptional Values.

22/6 to 50/-

Carriage is Paid.

PIKE
BRISBANE

BROTHERS
LIMITED

TOWNSVILLE
TOOWOOMBA

QUEENSLAND AGRICULTURAL JOURNAL

VOL. XIV.

AUGUST, 1920.

PART 2.

Agriculture.

PRODUCTIVITY OF PERENNIAL COTTON PLANTS.

BY DANIEL JONES.

Considerable interest has been taken in, and much discussion has followed, a recent statement anent the prolific character of cotton plants in this country. That the nature of the information should arouse some doubt—particularly to those conversant only with the habit of the plant in other cotton-growing countries—will cause little or no surprise. The claim that a cotton plant will, within a twelvemonth, furnish a yield of fibre in seed up to 20 lb. weight in that period is certainly something unusual to record. Nevertheless there is authentic evidence to prove this to be the case. I have gathered from a plant growing at the Rectory, Cairns, some fibre from a shrub planted by the Rev. Joseph Campbell, who certifies that in one year its yield was 20 lb. weight of fibre much superior to American cotton.

There is a statement, which I have not personally verified, that a variety of tree cotton (of which I had a sample) had in the one year also borne 20 lb. weight of fibre. This was obtained from the Logan district. The most recent and authentic record for a six months' harvest comes from the Bundaberg district, from Mr. William Howard, of Fairfield, Wongarra, who has sent to me a bag of cotton weighing 14 lb. which is the product of one shrub. The plant is now about eight years old, and until the present year had cropped luxuriantly; but no value was attached to the circumstance; hence the cotton was allowed to waste. Early in this year, Mr. Howard conceived the idea of investigating the merit of the fibre, and forwarded me an example, which I found to be a good sample of an Egyptian type of cotton, worth then, at Liverpool parity, at least from 9d. per lb. or more in seed. It is anticipated, when the next six months' picking is finished, that the return from this shrub will equal, if not surpass, the records indicated as obtained by the other growers.

On a recent quest for new types of cotton, I saw one shrub in the Bundaberg district that was trained over a trellis and used by the busy housewife as a laundry arbour, the spread of the plant being fully 20 ft. As in other instances, the valuable fibre was permitted to go to waste, no care of the plant or product being in evidence.

On making representations to the owner, suggesting the utilisation of the fibre, and showing that it was at least worth 6d. per lb. as gathered, the promise was readily given to harvest in future all the fibre procurable for seed and lint utilisation.

I have been considerably mortified, on more than one occasion, to find that shrubs of exceptional merit are destroyed by owners who aver that the fibre blowing about the yard created such a mess that they had to remove them. This all indicates with what ease and in how suitable a habitat the perennial varieties of the cotton plant find themselves in our sunny Queensland.

As evidence of this, I have recently obtained from the North an example of the Kidney variety of cotton which has grown untended for some years in a wild state to such an extent that recently the local authorities had to send the road gang to cut out the intruding cotton plants which obstructed the highway.

This fibre, as well as others described, would bring at least from 4s. to 6s. per lb. in lint in the Lancashire markets.

With regard to the productivity of the Upland variety of cotton, we are not able to show such high returns. Nevertheless we come very near to, if we do not surpass, the best American yields. A long-sampled Upland variety which I have been testing for about fourteen years, plants of which are now thriving at my home in Brisbane, has given excellent returns annually for the past thirteen years. One shrub has, owing largely to its location, borne much more fibre than the others. My record from this shrub in its twelfth year of bearing is 6 lb. weight of fibre. The others return from 2 lb. to 4 lb. each year, bearing—as do the tree-varieties—two crops in the year.

These plants being spaced—the Egyptian perennial at 12 ft. apart, and the long-stapled Upland at 6 ft.—will, in the first instance, furnish (basing the yield on an average of only 4 lb. weight per shrub with 302 plants to the acre) over £30 worth of cotton as the season's crop. In the other case, the long-stapled Upland, if spaced at 6 ft. apart (there being 1,210 plants per acre), valuing both sorts at 6d. per lb. in seed, it will be evident that, at these much reduced calculations, the value in each case will be over £30 worth of cotton per acre. We frequently hear of large yields, particularly from the irrigated areas in Arizona and the Imperial Valley in the United States of America. It is often claimed that a bale of lint (500 lb., and at times as much as 750 lb. of lint) is obtained to the acre in those favoured regions.

It is also asserted that with an adequate supply of water for irrigation purposes we, in Queensland, could materially increase the production of farm crops. It may be a matter of some surprise to many to learn that in this State there has been produced as much cotton to the acre, without any irrigation, as the Americans claim to have done with this supposed advantage. The fact remains that we have climatic and seasonal conditions in this country which amply compensate for the absence of water for irrigation purposes. By growing the drought-resisting perennial variety we can hold our own with any other competing country.

We have records of crops of Upland cotton reaching up to 2,300 lb. of seed cotton per acre. This, allowing 3 lb. of seed cotton to 1 lb. of lint, would mean a bale of lint weighing 766 lb. to the acre.

I recently learned, on a visit to the Ma Ma Creek district, that Mr. R. J. Dear sent to the Department of Agriculture, in 1918, 2,880 lb. of cotton from 2 acres, the value of which, at the then lower price, was over £27 per acre. This return shows it to be 480 lb. of lint to the acre obtained during a rather bad season. We thus learn that in the raising of this crop we have no need to dread oversea competitors, inasmuch as our seasonal and climatic conditions favour this vocation, enabling us to produce as cheaply as is assumed to be the case in countries where coloured labour is employed. In these calculations I have intentionally placed the estimates of profit and yield per acre on a low basis, so that if any prospective growers find them much under-estimated when testing the crop for themselves, they will be agreeably disappointed, as many growers know to be the case this season, which is so much the better for all concerned.

The fecundity of the cotton plant is demonstrated in a ginning test made recently in connection with the material obtained from the shrub grown by Mr. Howard, and referred to in this article. On ginning with a Macarthy roller gin, the 14 lb. of seed cotton returned as lint 5½ lb., with three-quarters of a pound of seed. As this is a free-seeding variety, the linting process indispensable with the Upland type is not required. For this reason it can be utilised for oil-making purposes without further treatment.

The comparison of lint to seed showed a very satisfactory result—viz., 37½ per cent. lint, and, taking the Liverpool value of fibre of this class at the low rate of 4s. per lb., it appears that the 5½ lb. yield is worth over 20s. What it may be possible to raise of this type on a large plantation system cannot as yet be definitely shown; nevertheless, the actual experience of what this and other shrubs have furnished would lead to the conclusion that a substantial profit is assured any who

elect to raise this sort of cotton. Another interesting factor in this connection relates to the fecundity of the plant in its seeding proclivities. Actual count showed that 213 seed weighed 1 oz. As the total weight of seed furnished was $8\frac{3}{4}$ lb., it follows that there are 3,392 seeds in a pound. This, multiplied by 16, gives as a gross total 29,332 seeds from this one plant in its six months' crop. This, assuming one in every three seed to be fertile enough to germinate, would prove sufficient to sow about 30 acres of this variety of cotton, spacing the plants 12 ft. by 12 ft.

This mass of seed from one plant conveys the idea that we in Queensland have a great advantage over countries that are, by force of circumstances, compelled to raise cotton as an annual, and rests on the fact that annual sowing is not expedient for many reasons, chief of which relates to the extra yield furnished in following the perennial system. A significant factor is also in evidence showing in what way well-informed authorities on cotton-growing can drift into error.

In an article in last month's Journal, taken from American sources, it is emphatically maintained that perennial cotton should not be cultivated, giving sundry reasons against the system.

In Queensland, for the past forty years growers have persisted in raising cotton, relying on its perennial merit; and much more than mere opinion will be needed to induce our growers to depart from this method. We invariably find that the second yield from ratoon Uplands gives a heavier crop than is obtained from the plant shrubs.

In the case of the large growing perennials, the maturity period from which the best yields are obtained ranges from the fourth year onward. The system coming into vogue in localities where the perennial Egyptian type flourishes best—viz., our coastal areas north of Brisbane—is to sow the Upland variety and the Egyptian in the same field, sowing the Egyptian in spaces 12 ft. apart, filling up the intervening spaces and rows with the earlier maturing Upland variety.

The reason for this new departure is in order to gain the advantage of an early crop which is furnished in five months from the Upland. The Egyptian sort is longer in bearing; hence the reason, as the new settler has a swift return, instead of waiting for a year or eighteen months for the Egyptian to come into profit.

When this plan is adopted, in from two to three years the Upland cotton will have outlived its utility, and can be cut out, leaving the field for the Egyptian plants. Observation shows that there is much to be learned and demonstrated in the tillage of the Egyptian plant.

I have, on many occasions, noted that, when these shrubs were submitted to the methods of tillage usually advised for the Upland variety, in most instances they have not thriven as might be expected. In almost every instance where I have observed a robust-growing Egyptian plant, it has always been one that has had little or no attention. Judging from this fact, it will be well to experiment in this direction, relying on such help as mulching, pruning, and a few other attentions which the grower will note as practical to carry out. Personally, I am of the opinion that in the future treatment of this type of cotton the method of cultivation will more nearly resemble that of an orchard than of a plantation system. Whether this be so or not will soon be proven, as several prospective growers in the Bundaberg district, noting the habit of the plant, aver their confidence in this system of raising cotton.

Contrary to experience elsewhere, perennial cotton here is not as subject to predatory insect troubles as is the Upland variety. In the United States and the West Indies, the objection to treating cotton as a perennial relates to the difficulty of dealing with these pests, coupled with the belief that perennial-grown cotton is defective in quality of staple.

We have on many occasions sent examples of perennial fibre to valuers in Lancashire and London, and the perennial-grown fibre has on every occasion been appraised as equal in value to the annual-grown article and, on most occasions, quoted as being worth more per lb. From this it will be seen that in this new country we must not follow the lead of folk who, lacking experience of our local conditions, elect to advise on these matters. It may be well left to the intelligence of the Queensland farmer to determine sooner or later for himself what method to pursue. We are rapidly gleaning facts by observation and experiment which indicate that in this crop we have sources of wealth undreamed of which will lead to solid advancement.

Recent cables from London report that some Queensland fibre valued for the Agent-General (Mr. J. M. Hunter) was appraised at 5s. per lb. This was also a variety of perennial-grown cotton. Other cotton of a perennial character was valued at from 4s. 2d. upward. This surely proves that the contention of the British

Cotton-growing Association, who have persistently objected to our growing perennial cotton, shows them to have misjudged the whole question. Some of these fibres were not longer than $1\frac{3}{16}$ in. to $1\frac{5}{16}$ in., the value of which was from 4s. 2d. to 4s. 8d. per lb. in lint.

We raise on perennial shrubs, fibre ranging from $1\frac{1}{2}$ in. to $1\frac{3}{4}$ in. long, which, if placed on the same market, would rival in value and quality that recently valued by the Lancashire brokers. During the past few months, Egyptian cotton has reached up to 8s. and 10s. per lb. A drop has recently occurred, but present values range from 4s. to 7s. 6d. per lb., which indicates that we, in this country, may look forward to a good demand for all the high-class cotton we have ability to produce.

SHORT- AND LONG-STAPLED COTTON.

A West Indian cotton planter, Mr. A. N. S. Cheales, lately visited Natal, and the "Natal Advertiser," recording his visit, the object of which was to develop the industry, said: "This gentleman seems to think that we in this country are very slow to realise the great shortage of cotton, and are not making the most of the favourable opportunity and high prices.

"It is a singular fact that planters on the North Coast who put in a few acres of cotton some years ago still grow only a few acres each year, although they have secured consistently £30 to £40 per acre per annum from their cotton and, admittedly, a bigger profit per acre than from their cane. Why, then, do these planters not plant more cotton? Why do their neighbours not take up cotton-growing?

"Again, in the Tugela Valley two companies have been making excellent profits out of cotton for some years, and around them are thousands of acres of land lying idle, while returned soldiers shout to the Government for farms. Why have adjoining farms to these not been put under cotton?

"We think, like our visitor, that the country needs more growers who understand the cotton plant, and more to take it up, with the determination that cotton will be made a success and to 'stick to cotton.' The Government cotton expert is always willing to give the advice necessary for one to soon acquire the requisite knowledge.

"Most likely the absence of a market has been the biggest hindrance to progress, and since the Cotton Growers' Association has provided marketing and ginning facilities that would be a lesson even to the West Indies, the expansion of cotton-growing may be expected to be more rapid.

"If Mr. Cheales comes to Natal and undertakes cotton-growing we are sure he will receive a hearty welcome. The South African cotton industry would greatly benefit by the introduction of new capital from outside.

"Especially would we like to see Mr. Cheales in the cotton industry here as he believes in the suitability of the climate and soil for Sea Island cotton. Undoubtedly the demand to-day is for a long-stapled Upland, Sea Island, or Egyptian type, and we are of the opinion that the best type to be grown here is the long-stapled Upland cotton of one and one-eighth to one and one-fourth inches. We do not wish to discourage Mr. Cheales in his desire to grow Sea Island. If it will grow anywhere in South Africa, that place is the Natal Coast. We wish him success and trust he will undertake the work and, if successful, then no doubt many will import West Indian managers, as he suggests. But it is as well to remember that Sea Island has failed where the American Upland has succeeded."

The above applies equally to the cotton-growing industry in Queensland, particularly in that we, in this State, with lands so eminently adapted to cotton-growing, from the New South Wales border to Thursday Island, and westward to the boundary of South Australia and the Northern Territory, are not only slow to realise the great, not possibilities, but certainties of the industry, but actually ignore the results of cotton-growing in this State during the American civil war.

We, ourselves, were in those days engaged in the industry. We established a ginnery at Oxley Creek west (Sherwood). We paid the farmers 3d. per lb. for their seed cotton, at which price they made more than by the raising of maize, potatoes, &c. To-day they are guaranteed by the Government a price of 5½d. per lb. for their seed cotton, with a participation, in addition, in all profits made by the sale of the lint. Everything points to a heavy shortage in cotton supplies in the future. Prices are

more likely to soar than to decline. Whilst other countries where cotton is largely grown, as in the United States, Egypt, &c., are troubled with serious pests which, in the former greatest cotton-growing country of the world, have been the cause of the devastation of large areas of the cotton States. Queensland growers are exempt from any but minor trouble in this respect. Yet we cannot impress upon them that a cotton crop will be more profitable to them than many other crops. For example, take the results of potato-growing in the Far North; some of the best varieties produce only from 2 to 3 tons per acre. We leave it to the farmers to work out which crop would pay them better—cotton or potatoes—account being taken in either case of cost of seed, cost of cultivation, harvesting, freight, &c.

Whilst Queensland is delaying, other countries are striving to extend the cultivation of cotton. The Government, in this State, has done all that is possible to encourage cotton-growing and to make the industry profitable both to the grower and the State. Why is this assistance not more generally recognised?

PLANT COTTON *v.* RATOONS.

Some growers advocate the ratooning of the cotton plant after the harvest, the idea being to obtain an early crop in the following season. There is, however, another side of the question. If the cotton has been planted at a distance of 4 ft. each way there will be 2,722 plants per acre, and, with farm labour at the present abnormal wages, the cost of pruning down this number of plants would make the succeeding crop unprofitable, besides which the ratooned crop will not be as prolific as a newly-planted crop. This has been clearly demonstrated in Zululand, where the ratooned crop, while giving a fair picking, bore not half as much as the December planting of the Bancroft variety. In selecting seed for planting purposes, the longest and best-stapled cottons should be chosen, and, by so doing, season after season, a cotton equal in strength, length, and lustre to the best grown in the valley of the Mississippi will result.

THE LONDON "TIMES" AND THE COTTON INDUSTRY.

The London "Times" Trade Supplement (October, 1919) is, throughout, a most exhaustive and interesting history of the cotton industry of the world from the field to the spinning mill. Commencing with the methods of cotton cultivation adopted in the world's cotton-growing countries, in respect of implements, hand labour, irrigation, the various pests and measures for combating them are described. The United States cotton crop, and the proceedings of the New Orleans Conference are discussed by Sir Charles W. Mucara, Bart., a celebrated authority on the cotton industry. Ginning, baling, buying, and selling cotton; the value of cotton seed; how cotton is spun; the construction, equipment, and working of modern spinning mills, and, in fact, everything relating to the world's cotton industry, is set forth clearly in this "Times" supplement. We could occupy all the available space in this Journal with only a résumé of what is therein set forth. We can, however, only touch on its salient points. What is not given a place to as a cotton-producing country is this vast island continent of Australia. The only mention of it refers to its position amongst the markets of the world for British cotton goods. The quantities of raw cotton purchased in different countries include India, 60,000,000 lb.; other Empire countries, 14,000,000 lb. Under the head of cotton goods sold to the outside world, we find 1,666,000 yards were sold to Australia—to a country eminently adapted to cotton growing, free from any such diseases of the plant and boll as affect the United States and other lands; yet capable of overtaking those States in cotton production if its population were increased by the immigration of thousands of our own countrymen from Great Britain.

The Queensland Department of Agriculture has taken the utmost care to prevent the introduction of the boll weevil and the pink boll worm, and consequently these do not exist anywhere in Australia.

What has the "Times" to tell us of the ravages of these pests?

THE BOLL WEEVIL.

"Many years ago it was stated by a leading authority in the United States that, from the time of planting to the time of maturity, cotton was the constant object of attack. The chief insect which causes serious injury to the plants is the boll weevil. The little pest appeared in Mexico as far back as 1862, but it was not till about 1892 that the insect was discovered in the Southern States of America.

It is estimated that about two-thirds of the cotton belt in the United States is now affected more or less by the exertions of the boll weevil, and it is not too much to say that, but for this untoward development, the amount of cotton grown would, by this time, have been increased nearly 100 per cent.* That is to say, that the total production of the United States cotton would now amount to 27,000,000 lb. instead of as this year to only 13,500,000 lb.

THE PINK BOLL WORM.

The other most serious enemy of the cotton plant is the pink boll worm, which is understood to be a native of Egypt, where, for many years, it has done great damage to the cotton crops. It was not until about 1911 that this pest was noted in Mexico, and it is stated that unquestionably this insect was introduced to the Western World through importations of Egyptian cotton seed. In two or three years its ravages had caused great apprehension. It was estimated that, in 1917, about 3,000 acres of cotton land in Texas (U.S.A.) were affected by the pink boll worm.

The "Times" article further states that, "as in the case of many other crops, an important factor is an abundant supply of cheap labour. This might hardly be thought of vital importance from a consideration of the simple nature of the cultivation of the cotton plant, which includes, as for any other crop, thorough preparation of the soil; the use of a comparatively small quantity of manure; thick sowing of the seed, which is inexpensive*; thinning out the seedlings to appropriate distances in the rows; careful interculture during the growing period, to free the land of weeds and prevent undue evaporation of soil moisture, this interculture ceasing as soon as the bolls begin to form; and, lastly, picking the cotton out of the bolls when they open—this does not seem a formidable programme of work," and is incidental to all farm crops. Dr. A. E. Barber, C.I.E., the author of the "Times" article on "Methods of Cultivation," says: "Without doubt, a machine could be constructed to sow the seeds at the required distance, and some day, perhaps, the persistent attempts at the invention of a mechanical picker may be crowned with success, leaving nothing for the hand labourer to do."

As far as the sowing of the seeds by machinery is concerned, we venture to say that that difficulty has been overcome, as stated in the "Queensland Agricultural Journal" (October, 1919) by the manager of the State Farm, Roma (Queensland), who forwarded to the Department a sample of cotton seed specially prepared to admit of sowing by a seed drill. In commenting on the matter, the Director of Agriculture, Mr. Quodling, states that the fluffy fibre adhering to Upland cotton seed after ginning and "linting" causes the seeds to bunch together, which means that the sowing must be done by hand, which is a tedious process. This difficulty has been now overcome by treating the seed with fine puddled clay, which envelops the loose fibre, and leaves the seed in a smooth rounded form, in which condition, after drying, it will readily pass through the drill—a process calculated to reduce the cost of planting operations. In the accompanying illustration No. 1 shows the seed as it leaves the gin, and No. 2 shows it as prepared for the drill. A mechanical pneumatic cotton picker was invented by Mr. Daniel Jones, cotton expert of the Department of Agriculture (Queensland), which has been improved upon in California, U.S.A., from accounts received in April, 1919, and was fully described and illustrated in this Journal in April 1919. The work done by it without injury to unopened bolls amounted to 5,000 lb. per day of ten hours. The machine is said to be a complete success in America, but it has not yet made its appearance in Queensland.

COTTON PROOF AGAINST DAMAGE BY DROUGHT OR RAIN.

It has frequently been stated that under certain climatic conditions, the cotton, just after emerging from the boll, will suffer from discolouration and weakness of the fibre. That this is not often the case can be shown by the boll here illustrated. The plant from which it was taken was raised from seed (Duranga), sown in September, 1919. It lay long in the ground before germinating, and only fruited in May, 1920. The boll burst in May and the cotton was exposed to heavy showers of rain, and, later on, to cold winds and frost. Notwithstanding this, it retained its lustre and perfect colour when picked late in June last, not having the slightest sign of discolouration, nor was the length or strength of the fibre in the least impaired, the length of staple being $1\frac{1}{2}$ in. Illustration by Arthur Nicholson, Department of Agriculture and Stock.

* Seed is liberally supplied to growers in Queensland, at no cost to them, by the Department of Agriculture.—Ed.



COTTON PLANTING.

The "South African Sugar Journal" states that the cotton industry is steadily spreading in Zululand, and some nice crops are observable from the railway line. As has been pointed out before, the low price of sugar is forcing South African planters to seriously consider whether they should not go in for this industry in preference to sugar-cane growing. In many instances, land which would have gone under cane is now going under cotton.

The same journal deals with the necessity for

CROP ROTATIONS.

It is not advisable to grow any crops on the same land year after year—an axiom accepted by agriculturists the world over. This being the case, cotton growers are considering what other crops they can put in. Those in the sugar belt, no doubt, after two years with cotton, will find it necessary to revert to cane. Those, however, who have a suitable soil would find it to their advantage to plant, for one season, monkey-nuts (peanuts). Monkey-nuts are a leguminous crop and, apart from being a change for the soil, supply nitrogen.

Apart from being an advantage to the soil, the crop is a very profitable one, good, sound monkey-nuts being worth approximately 3d. per lb. in the shell.* For certain areas, in addition to monkey-nuts, mealies (maize), or kaffir corn provide another crop in the rotation.

Mr. W. H. Scherffius, Chief of the Tobacco and Cotton Division, used on the experimental plots at Rustenburg Experiment Station the following rotation:—

First year .. Cotton.

Second year .. A legume (either monkey-nuts, velvet beans, cow peas or soya beans).

Third year .. Mealies during the summer, and a winter-cereal, such as oats or wheat, during the winter if the land were irrigable.

Fourth year .. Tobacco.

Fifth year .. Cotton again, and so on in the rotation as named.

Some growers on the coast may find it advantageous to rotate cotton with bananas, pineapples and such crops as these, which are rather commonly grown on the coast but not up country.

ROTATION AND DISEASES.

A field of cotton recently inspected, on which the cotton stood well and was healthy throughout, was a field that four years ago suffered through the cotton dying out in patches. This fault was attributed at the time to the fungus disease known as "cotton wilt." The land is in the meantime being cultivated to mealies, rape, and root crops.

It may not be that the freedom from disease this season is due to the crop rotation, but the effects are worth noting, and if similar results can be secured continually the practice is worth following.

TO COTTON GROWERS: COTTON SEED.

The Department of Agriculture and Stock will be pleased to supply growers with cotton seed free of cost and railage paid.

Further, the Department will advance 5½d. per lb. on all seed cotton free from disease and of good quality grown prior to the 30th June, 1922, consigned to the Department and delivered at the railway station or port nearest to the place where it was grown.

The raw cotton will be subsequently ginned and sold, on owner's account, and after paying the expenses, the surplus over and above the original 5½d. per lb. will be paid to the supplier of the raw cotton.

In the Department's cotton pamphlet it will be noted that the amount required to plant an acre is given as 5 lbs., but the Department allows 10 lbs. of seed to the acre for each applicant to provide for replants or any other contingencies.

* 6d. to 7d. in Queensland.

IRRIGATION OF THE WOONGARRA SUGAR DISTRICT, BUNDABERG.

In the course of the highly successful demonstration on the annual field day, on 5th June last, when farmers from near and far gathered, at the invitation of the Department of Agriculture, to learn something concerning the experiments continuously carried on at the Sugar Experiment Station, the subject of irrigation of the Woongarra district was brought up by Messrs. Cattermull and A. C. Maughan. For some years this subject has been in abeyance. It may interest the sugar-growers of the district if we reproduce some notes recorded by the Editor of this journal when on an official visit to various districts of the State, coastwise and as far inland as Longreach and Thargomindah, to obtain all available data on the application of irrigation to cultivated lands. Amongst the localities visited was the Woongarra Scrub, and the following was what we gathered from Mr. J. White, M.L.A., erstwhile Minister for Agriculture, Dr. Walter Maxwell, then (1902) Director of Sugar Experiment Stations in Queensland, and local farmers. Space will not allow of a full account of the labours of well-sinking to obtain the necessary water for the irrigation of the cane crops of this fertile tract of country; but we can give an abridged account of what was proposed and how the waters of the Elliot River could be utilised for purposes of planting, saving, and increasing the crops. To form some idea of what was proposed to be done for the district, the reader must suppose a level area of some 6,000 acres extending from within 4 miles of Bundaberg to the ocean, some 6 miles further. The only high hill in the district is called "The Hummock," a basaltic hill about 220 ft. in height, which gives its name to the historic plantation on which it is situated. There is a river in the district, named the Elliot, which takes its rise in the country between Bundaberg and Maryborough, and flows into the ocean near the Springfield town reserve.

On Mr. White's invitation, we drove out to inspect it. The portion of the country where we struck the river is sandy, scrubby, and intersected by gullies and billabongs, mostly full of clear, fresh, running water. The river itself resembles in some respects the upper reaches of the Barron River above the falls at Kuranda, only here sand takes the place of rock which forms the bed of the Barron. There are long, deep reaches, 200 ft. wide, the depth of which varies from 17 to 38 ft., according to accurate soundings which were taken during a period extending over six weeks.

Some of the reaches are as wide as stated, while others are from 1 to 2 chains in width. Then comes a "narrow" where the clear, cool water rushes past with great velocity, and where the white, sandy bottom can be plainly seen at a depth of from 6 to 8 ft. Below each "narrow" is another extensive reach. The water flowing in this reach is permanent, and some evidence of this is afforded by the quantity and large size of the fish which inhabit it. It has been stated that 7,000,000 gallons of water pass down the stream every twenty-four hours. I am not aware how this flow was estimated, but I presume that it was based on the principle of measuring the flow by the shallowest spots. Where a river is divided into deep reaches by shallow narrows, the flow of water passing down the stream is gauged by the flow along these narrows. A reach may be 30 ft. deep, but if the outlet be only 4 ft. deep, then only 4 ft. of water are in motion, and the remaining 26 ft. are stationary. But this was doubtless taken into consideration in determining the daily flow of the Elliot River. I merely point this out, as it might be asked, how 12,000,000 gallons daily (which is the quantity estimated, as needed to irrigate 3,000 acres) can be supplied from a river down which only 7,000,000 gallons a day pass. The stationary water must come into the bill by the use of pumps. The highest point of the land to be irrigated lies at an elevation of 117 ft. above the surface of the water—this, during a drought. I was informed by an authority on irrigation that when rain fell in March, and the Burnett River ran strongly, there was no response in the former river.

The scheme favoured in 1902 by the residents on the Woongarra land, or, say, by a majority of them (for some objected to a probable water rate) was to carry the waters of the Elliott by pipes 32 in. in diameter for a distance of 6 miles to a reservoir on the top of the Hummock, a height of 218 ft. Thence it was proposed to

irrigate, by gravitation, an area of 3,000 acres only, although there are 6,000 acres within the irrigable area. The pumping plant which would be installed would send 12,000,000 gallons daily over 3,000 acres. The financial aspect of the scheme in those days indicated that a sum of £70,000 would be required to carry it out. Supposing the £70,000 to have been obtained either by loan or by the issue of debentures, then interest and redemption would have to be provided for. This, it was believed, could have been done by the imposition of an irrigation water rate of £3 per acre.

The question agitating the mind of the Woongarra settlers was: "Would the increased crops enable them to pay this rate and yet make a good profit for the farmer?" The results would be expected to work out in this way:—On the debtor side the farmer would have to spend on cultivating and manuring per acre £17, and for water rate £3, total £20. On the credit side:—60 tons of cane per acre, at 12s. per ton, £36; deduct £20. This leaves net balance to credit per acre, £16.

If we compare the cost per acre by this scheme with that by the well system, it will be seen that there is very little difference between them as, by the latter, a farmer possessed of the necessary capital could lay down a plant sufficient to irrigate 200 acres for £760 (as at the date under review) at Waterview, or to irrigate 250 acres, as at the mill well at Qunaba, for £2,057; or, again, to irrigate 300 acres for £832, as at Davidson's Well—the cost depending on the nature of the country through which the well is sunk, the height to which the water has to be lifted, the cost of fuel, the lay of the land, and the distance of the pump from the highest point of land to be irrigated. In our next issue of the journal we will recall what the Woongarra cane-growers did in former years in the search for the precious water so indispensable to their welfare, and, indeed, to their very existence on the land.

(TO BE CONTINUED.)

IRISH BLIGHT.

By A. H. BENSON, Director of Fruit Culture.

The attention of potato and tomato growers is drawn to the necessity of their taking every possible precaution to prevent the destruction of their crops during the coming season from "Irish Blight," as this disease has recently made its appearance in several coastal districts. The outbreak is due to the exceptionally favourable weather conditions that have prevailed, such conditions being ideal for the development of the fungus causing the disease.

The following extract, which I have taken from the last edition of my pamphlet on the "Destruction of Fruit and Vegetable Pests," should be carefully studied, as, if the precautionary measures advocated therein are thoroughly carried out, there should be little loss from this pest, should the weather conditions during the coming spring prove favourable for its development.

With respect to tomatoes the same treatment recommended in the case of potatoes is efficacious, viz., the systematic spraying of the young plants from the time they are a few inches high right up to the fruiting stage, whenever the weather conditions are favourable for the development of the disease.

"This extremely destructive fungus is fortunately capable of being kept in control by the exercise of simple precautions, provided these precautions are taken at the right time and are properly carried out.

"Like most fungus diseases Irish blight is much easier to prevent than to cure, as once it makes its appearance it is so rapid in its action, provided the weather conditions are favourable for its development, that it is possible for the entire crop to be destroyed before any effective action can be taken to check it. Fortunately such weather conditions are by no means common in this State, and on that account, although we are always subject to sporadic outbreaks, it is very unlikely that the whole crop of a district will be destroyed. At the same time, the disease is of such a serious nature that we cannot afford to neglect any precautions to keep it in

check. Irish blight is not confined to potatoes, but it attacks tomatoes as well as many other introduced and indigenous plants belonging to the same family, so that it is by no means an easy pest to exterminate, as there are host plants available for its development and propagation throughout the year; and were it not for our experiencing hot, dry spells, when the spores of the fungus are destroyed (as they cannot withstand our sun heat), we would experience much greater losses than we do. Although this disease has been described by many very able writers, there are still growers who are unable to identify it in its first stages, and to such the following remarks will be found useful:—

“The first indication of the disease is seen on the foliage, the edges of the leaves being turned black. If these leaves are examined in the early morning the blackened portion will be found to be covered with a fine glistening white mould on the under side of the leaf, which usually disappears during the heat of the day. The next stage is the blackening of the whole of the tops and their death, and in bad cases the rotting of the tubers as well.

“Black spots all over the leaves are not Irish blight, but usually indicate early blight or the *Macrosporium* of the potato; but the white mould on the under side of the leaves is a certain indication.

“The disease makes its appearance on the tubers in the form of slightly sunken patches on the skin, by the discolouration of the skin, and by the discolouration of the flesh of the tuber just under the skin. These are the first indications, and they soon become much more pronounced till, finally, the whole tuber is a rotten mass and possesses a strong putrefactive odour, the result of decomposition due to bacterial agencies. This is the so-called smell of Irish blight; but when the smell is present the disease has done its work, and putrefactive agencies are completing the damage it started.

“As the treatment for Irish blight is mainly preventive it is necessary to deal with it pretty fully. It is of a threefold nature—the treatment of the seed, that of the growing crop, and that of the tubers when harvested. With respect to the seed, the following precautions are recommended:—

First.—Cut all seed.

Second.—Discard any seed that shows any signs of diseased or abnormal conditions, such as any discolouration of the flesh or skin, sweating at the eyes, or scabbiness of the skin.

Third.—Dip all seed in a solution of formalin for at least two hours. The solution is made by adding 1 pint of formalin (40 per cent.) to 24 gallons of water. This will destroy any spores adhering to the surface of the potato.

“If round seed is planted without being cut it should be very carefully examined for any sign of the disease on the skin, and all doubtful tubers should be excluded; the balance dipped as recommended. Dipping cut seed prevents its rotting in the ground when it is planted—a condition which frequently occurs when untreated cut seed is planted during the late summer and early autumn.

“The growing crop is treated by spraying with Bordeaux or Burgundy mixture, the latter being, in my opinion, preferable to the former for this particular disease. Burgundy mixture is made as follows:—

“Dissolve 8 lb. of sulphate of copper (bluestone) in a cask holding 35 gallons of water. Next dissolve 10 lb. of washing soda in 5 gallons of water in another vessel; finally pour the solution of washing soda slowly into the bluestone solution, stirring the mixture continuously whilst doing so; and it is then ready for use.

“Burgundy mixture should always be used as soon as it is made, as it quickly deteriorates and loses its adhesive properties.

“Where blight is prevalent, several sprayings are necessary during the growing period, the first of which should always be given when the plants are about 6 to 8 in. high; and the subsequent sprayings should be given when required. No hard-and-fast lines can be laid down for the exact time of the second or later sprayings, as the time is mainly governed by weather conditions. If these are favourable for the

development of the disease—viz., moist, foggy, or humid weather—then the spraying must be repeated at frequent intervals, as the young leaves as they develop must be protected by being coated with the spraying material. On the other hand, if dry, warm weather follows, a second spraying when the plants have made their full growth is all that is necessary to prevent the disease doing any serious damage, and in the majority of cases in this climate it will render the crop practically immune. In addition to spraying, the keeping of the land in a good state of tilth so that the plants can be well hilled up is very desirable, as, should disease appear on the tops, if the tubers are well protected by a good soil mulch there is a possibility of the spores produced on the foliage being unable to reach the tubers, especially if warm, dry weather conditions follow the moist conditions which were present when the tops were attacked. If the tops are attacked when the tubers are well developed, it is a good plan to cut off and burn all the tops, as by doing so the tubers will be frequently saved.

“The handling of the tubers when digging and after they are dug is also a matter in which great care should be exercised. Digging should, if possible, be done when the soil is dry enough not to stick to the tubers; as, if the tubers are covered with soil, it is very difficult to pick out any diseased ones; this is very important, as should diseased tubers be placed in the same bag with sound tubers they are likely to infect such sound tubers, especially if they are wet. Careful handling at the time of digging is therefore important, as every tuber showing the slightest trace of the disease should be picked out, boiled, and fed to pigs or other farm animals. When the tubers are placed in the bag, see that they do not become sunburnt, a common occurrence with immature tubers; but on no account place a quantity of diseased tops on the bags to keep off the sun, as there is no better way of infecting the tubers in the bag; cover with an empty bag, if necessary, but never with potato tops. When bagged, see that the tubers are kept dry; don't store them when wet, as this will encourage the development of any spores that may be attached to the tubers.

“The treatment recommended for Irish blight is equally efficacious in the case of early blight—a disease which attacks both potatoes and tomatoes, and frequently materially injures the yield. When leaf-eating insects of any kind are present, arsenate of lead should be added to the Bordeaux or Burgundy mixture, thus forming a combined spray that possesses both fungicidal and insecticidal properties.”

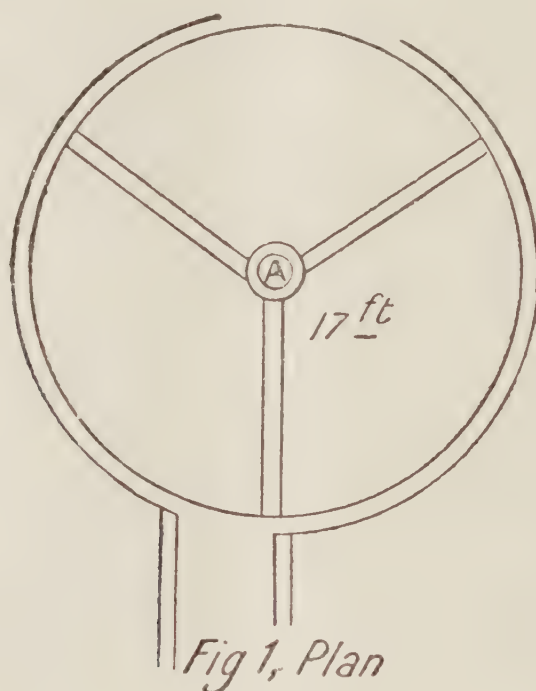
A RAPID EARTH THRUST-BORER.

During the long period of trench warfare, many devices were proposed for enabling bores to be made through the earth towards the enemy trenches so as to reach their mines. One invention by two British officers underwent successful trials, but it was never put to full use because it proved rather complex and cumbrous. This attempt, however, inspired one of the officers to design a much simpler appliance for rapidly and accurately boring a hole through clay and other heavy soil for drainage purposes, and laying electric cables or pipes. It is a portable hydraulic appliance, power being supplied by a small petrol engine, and it operates by the simple process of pushing a steel rod, fitted with a header of the diameter required, straight into the soil in the direction required. The rod is about 4 ft. long, and when it is pushed home, another rod is coupled to it and the forcing process is repeated. This goes on until anything from 100 to 150 ft. of rod have been forced through. As the diameter of the rod is much less than that of the hole, withdrawal is easy. Holes up to 15 in. in diameter can be made on this system, and experience has shown that with two men working ahead on the pit necessary to accommodate the machine, a boring team of three men can complete two 150-ft. borings in an eight-hour working day. Clay, consolidated loam, and sandy soil with a good percentage of clay can be satisfactorily bored by the machine. There is remarkably little deviation from the straight line in which the appliance is originally set.—“Industrial Publicity Service.”

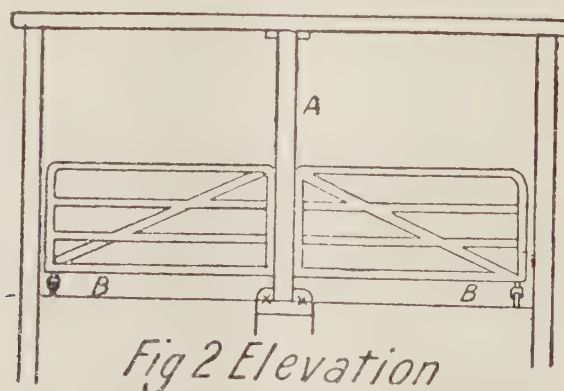
Pastoral.

SHEEP-PENNING DEVICE.

A correspondent of the "South African Farmers' Advocate" has furnished sketches and explanations of a device used when sheep were spout washed, and which might be used to simplify the work of penning up and compelling the sheep, without forcing or knocking about, to face the water when dipping for ticks, &c., or "jetting" for blowflies. The contrivance is a circular platform shown in plan, fig. 1, about



17 ft. in diameter, working on a central post or spindle, A, fig. 2, and supported by stout castor wheels, B, at the edge of the platform. The platform is divided into three pens. The pen in front, being full of sheep, acts as a draw for those behind. When the one pen is emptied, the platform is revolved, and a pull pen is at once



available and the empty pen is easily filled. The circumference of the platform is boarded in, except at the opening where the sheep are thrown in and at the penning race. An improvement may be secured by dividing the platform into four compartments instead of three, thus throwing in the sheep at a right angle instead of in front. The sheep would probably pen up better.

Dairying.

DISTINCTION BETWEEN THE MILKING SHORTHORN AND THE ILLAWARRA SHORTHORN.

In connection with an inquiry made by a correspondent as to the distinction between the Milking Shorthorn and the Illawarra Shorthorn, Mr. E. Graham, Chief Dairy Expert, submits the following:—

“The Milking Shorthorn is a breed of dairy cattle evolved by stud masters in Great Britain. The names of the brothers Charles and Robert Colling stand out prominently amongst stud masters who were successful in establishing and maintaining a high standard of dual purpose cow, and these breeders utilise the Shorthorn strains as the medium.

“Records available indicate that the cattle of the Teesdale district during the middle of the eighteenth century carried a good deal of Shorthorn blood in their veins, and the dairy herds of that district were then recognised as first-class dairy animals, capable of yielding daily, several gallons of milk per cow. The famous stud masters, Colling Brothers, disposed of their respective Shorthorn herds within the years 1810 to 1818, and other breeders were thus afforded an opportunity to obtain Shorthorn animals that had been bred on sound dual purpose lines—that is, for milk and beef combined.

“About this period, however, it appears that the tendency of stud masters was to breed Shorthorns almost exclusively for beef purposes, and to pay little or no regard to the milk-producing capabilities of the animals.

“The first Shorthorn Herd Book in Great Britain was issued in 1822. Naturally, as beef was the objective of breeders, the beef characteristics gradually overshadowed the milking qualities of the Shorthorn, but, of course, any change in type would necessarily be gradual, and for years after the inclination to breed solely for beef had set in, there was still a number of cattle of the Shorthorn type that possessed good milking qualities, but, of course, the number was being reduced proportionate with the success achieved in the breeding on beef lines. This condition of affairs continued until the outcry, both in Great Britain and abroad, for Shorthorns with some dairy characteristics practically compelled the Shorthorn Society of Great Britain to renew the position, and to make some attempt to develop the milking trait of the modern Shorthorn. The Shorthorn Society responded by donating a substantial sum in prizes for pure Shorthorn cows in milk that were capable of fulfilling prescribed conditions as to milking capacity and udder development. No doubt, this action of the Shorthorn Society was instrumental in prompting many stud masters to make a serious effort to reconstitute the milking characteristics of the breed in many herds.

“The above summary of the history of the Shorthorn in Great Britain is rendered necessary in order to supply an answer to the query asked, because it is principally from Shorthorn stock imported from Great Britain that the Milking Shorthorn herds in Australia have originated. It must, however, be remembered that the Australian type of Shorthorn is different to the English type of Dairy Shorthorn.

“In regard to the Illawarra breed of dairy stock, the evidence is that the Illawarra breed of dairy stock was founded chiefly on the Shorthorn strains of cattle imported from Great Britain, combined with an admixture of Ayrshire and Devon blood. In the early history of dairying in Australia, the Illawarra District, in New South Wales, was the foremost dairying centre in this continent, and the name of the district became applied, in a general way, to the cattle employed by the dairymen of that particular district.

“As time went on, a number of breeders of this particular strain of dairy stock combined, and formed an Association entitled the ‘Illawarra Dairy Cattle Association.’ This action laid claim for the recognition of the Illawarra Shorthorn as a distinct breed of dairy cattle.

“Amongst the rules of the Association relating to the registration of animals in the Herd Book, considerable importance was placed upon the capabilities of the animals to produce milk and butter in large quantities.

“Until recently, in Queensland, the breeders of Illawarra herds supported an Illawarra Dairy Cattle Association, as distinct from the Milking Shorthorn Society, but some little time ago an amalgamation was arranged between the members of the two Associations, and, as a result of this, the two interests were combined under an Association styled ‘The Illawarra Milking Shorthorn Society of Queensland.’

“The probabilities are that, as a result of the amalgamation, any distinction that formally existed between the Milking Shorthorn and Illawarra strains of dairy stock will gradually become less obvious as the influence of the Association extends.”

COMPARATIVE COST OF CHEESE AND BUTTER MAKING.

In reply to a correspondent asking for information regarding cheese-making as compared with butter-making, Mr. E. Graham, Chief Dairy Expert, Department of Agriculture and Stock, said:

“The statistics in connection with the manufacture of dairy products of different kinds indicate that during the year 1918-19 (the last period for which statistics are available), there were produced in the State 32,371,573 lb. of butter and 8,636,700 lb. of cheese. In the manufacture of butter there were something over 70,000,000 gallons of milk utilised, and about 8,500,000 gallons of milk were utilised in the manufacture of cheese.

In regard to the price of butter and cheese, I have to state that, during the last four or five years the wholesale and retail price of dairy produce has been fixed by the Federal Government, and at present the price of butter in this State is fixed at 228s. 4d. per cwt., and the price of cheese has been fixed at 1s. 1½d. per lb. for cheese of a large size, and at a rate of 1s. 2d. per lb. for loaf cheese. These are wholesale prices.

A fairly accurate basis for calculating the relative price of milk for cheese or butter purposes is to assume that the cost of manufacture of a pound of butter is 2½d. to 3d. per lb., and the cost to manufacture a pound of cheese ranges from 3d. to 3½d. per lb. It takes approximately 2½ gallons of milk to 1 lb. of butter, and milk of a similar degree in richness will be capable of producing approximately 2½ lb. of cheese. Usually the price paid per gallon of milk at the cheese factory is slightly greater than the rate paid for milk utilised in the manufacture of butter; but this advantage is counterbalanced, because farmers supplying milk to a cheese factory only receive whey for the purpose of feeding calves and other lower animals, while those supplying cream to a butter factory have the skim milk for stock feeding purposes, and the latter is generally accepted as being twofold the value of whey.

The advantages in the establishment of a cheese factory are that the factory can be erected at a lower cost than that of a butter factory, and in instances where a community of dairy farmers are more or less isolated in a district that is not conveniently connected with a butter factory, the erection of a cheese factory in such cases has been found advantageous. However, there are certain drawbacks in connection with the cheese business that are worthy of consideration. For instance, in the case of supplying milk to a cheese factory, it is necessary that the milk be delivered to the factory daily, and if the roads leading to the factory from the farms for the haulage of the milk are lengthy, this cartage becomes an expensive item. Further, it must be remembered that an appreciable high development of acidity in milk prohibits the milk being manufactured into a cheese of high quality, and I am afraid that, in your district, during the summer months, the milk will frequently be found to develop more acidity than is conducive to the manufacture of a cheese of good quality.

At present the future of the cheese industry is difficult to forecast. The value of cheese in Queensland is generally assessed on the basis of the value of the article for export, Great Britain being the principal purchaser of the surplus cheese of this State. The recent cable advices from London relative to dairy produce in Great Britain infer that the Imperial authorities are extremely anxious to secure all the butter available, both from New Zealand and the Commonwealth. They have not expressed any desire to enter into negotiation for the purchase of cheese, as they consider that the internal production of cheese will be adequate to meet their requirements.”

The Horse.

WAR RECORD OF THE SUFFOLK PUNCH.

In previous issues of this Journal we have pointed out the great value of this breed of horses, as fast, active, good-tempered and good-constitutioned as a draught horse, and even as a heavy saddle horse. The "South African Farm Advocate" for 20th June bears the following testimony to "The Great War Record" of a Suffolk Punch:—

"Few horses which have undergone the terrible strain of active warfare in France have as good a record for such hard work and complete immunity from sickness as this Suffolk Punch gelding, who has been with the forces in Northern France pulling heavy guns for 4½ years. During the whole of that time he has not spent even a single day in the sick lines. A Suffolk officer who was in France for the greater part of the war was posted to a division to which this Suffolk belonged, and he naturally became interested in him. The wonderful capabilities of this Punch gelding, compared with other horses, quickly attracted the attention of the Brigade officers, and as he was always at work it became a matter of comment with officers and men. This gelding was purchased in Suffolk early in the war and he was soon out in France, being put to work pulling heavy guns. He has been in 'the thick of it' all through the war, he has outlived his drivers several times, and has never been 'sick nor sorry.' He went through the great fights on the Vimy Ridge, at Arras, and on the Somme, while, as one of his admirers put it, he was several months on the awful tracks on the Ypres salient. In spite of it all, he was never out of action and always looked in the best of condition, carrying plenty of flesh; everyone who saw him remarked upon his condition. This is the report of the officer commanding the heavy battery in which this Suffolk served. Though eight years old, he has now gone into the Army of Occupation. This Punch gelding proved himself an ideal draught horse, and with the help of another horse has pulled 60-pounder guns. After 4½ years it is a great testimony to the Suffolk breed that this gelding should have been sent into the permanent army."

It may doubtless be of some interest to horse-lovers to repeat what we wrote twelve years ago on this breed of horses, based on personal experience in Queensland:—

"Whether the Suffolk Punch will ever reach the position of the most favoured heavy horse is, perhaps, a matter of considerable doubt, but to those who require for their work a fast, active, good-tempered and good-constitutioned draught horse, there is no gainsaying the fact that they might do far worse for themselves than by giving a chance to the handsome and long-lived Suffolk Punch, whose antiquity alone may commend him to their consideration.

"Even as a heavy saddle horse, the Suffolk is a treasure. The writer bought a beautiful, nuggetty, silver-maned chestnut Suffolk from Mr. White, of Bluff Downs, North Queensland, in 1875. A more powerful, docile horse for a traveller could not be imagined. Fast, he was not; but for endurance he could not be surpassed. The proof of this may be shown that, on one occasion, the writer left the late Mr. William Hann's station at Maryvale (N.Q.) at 6 a.m. to make a station only 40 miles distant. Mr. Hann gave directions for a short cut through the bush; but, as it turned out, "the longest way round would have been the shortest way home," for, after carefully following directions, nightfall found the traveller in a piece of waterless broken country, and during the whole day no water had been found. After a fruitless endeavour to track the footsteps of a shod horse on the bank of a dry gully, it was decided to leave the matter to the horse. He set off at a quick walk, which he never relaxed till 4 a.m. the next morning, when he brought up at the first water on Tara station, and then trotted gaily on to Maryvale, a journey of nearly 80 miles. At 8 a.m. he started again, this time in company with the mailman, and reached his destination at 6 p.m., making a journey of 120 miles with only a spell of about two hours, and he was as fresh as a daisy on arrival. Next day he was ridden 30 miles a day to the Etheridge, *viâ* Gilberton, and returned to Townsville, after three days' spell at Georgetown, as lively and in as good condition and temper as if he had only had a day's outing. That horse cost £25, and he was worth £50. Now, here is an

account of this breed of horses which must convince anyone that the Suffolk Punch is the horse, *par excellence*, for the farmer, taken from a paper by Mr. A. Jacques,* of Lamerton, Alberta, Manitoba:—

“Perhaps, in the eyes of the ordinary visitor to an agricultural show, there is no variety of the so-called heavy horse more attractive than the Suffolk. The breed, moreover, comes as somewhat of a novelty to many persons, for, in spite of the great claims possessed by the Suffolk upon the suffrages of the agriculturist and the townsman, it is still in East Anglia that his merits are most keenly appreciated, and, in fact, the farmers in that part of the country prefer the Suffolk to any other breed of heavy horse.

“It is still, however, against the breed that the proportions of a Suffolk do not equal those of a Clydesdale or a Shire horse, many persons being thereby led away into a belief that the east country animals are proportionately weaker than the others; whereas those who are best acquainted with their merits entertain the opinion that considering his height—16 hands 1 inch is the recognised limit of stature in connection with this breed—the Suffolk is quite as powerful an animal as any other breed of horse in existence.

“Probably, therefore, if he were better known in Western Canada, the Suffolk would considerably increase the circle of his supporters; but, in the face of the patronage that is now being extended to both Clydesdales and Shires, the development of the Punch will be for a time retarded. Nevertheless, he is holding his ground in many other countries, and is being largely sought after by the Germans, Austrians, and Russians, to be used in their Government studs for the purpose of crossing and getting artillery horses. No doubt this horse has not the weight or power to draw through crowded streets heavy lorries and other such cumbersome vehicles when loaded to their utmost. Such duties lie far more within the province of the Clydesdale or the Shire; but, in front of a plough, with a good man behind it, a pair of Suffolks can get through a day’s work that should amply satisfy the requirements of any reasonably-minded agriculturist. Then, too, for the lighter class of goods traffic in towns, the Suffolk is a very suitable horse; he is so much more active than the Clyde or Shire, in addition to being faster than either, that he can get through a day’s work in a comparatively light wagon far better than they.

“The precise origin of the Suffolk is, like that of most ancient breeds, enshrouded in obscurity; but, at the same time, the antiquity of this horse is absolutely beyond all question. So far back as the year 1720 allusions to the breed in the Ipswich Journal are so frequent as to render it certain that it was firmly established at that remote period. Indeed, it is asserted by some that the Suffolks were cultivated as a distinct breed 500 years ago, by crossing the old Norman horse with East Anglia mares; though, it must be observed, in justice to other breeds of less remote antiquity, that the proofs of such assertions are insufficient. Be this as it may, the fact remains that the Suffolks of the present day can boast of pedigrees that extend back as far as 1768, at which period there existed a notable but nameless stallion belonging to one Crisp, a resident of Ufford, near Woodbridge.

“Of course, no colour of coat other than chestnut is admissible in an animal that is desired to enter for the Suffolk Stud Book Association, it being distinctly laid down that, though the shade may vary, there is no place for any horse save chestnuts in the Society’s official volume.

“In addition to colour, the Suffolk is distinguished from the Clydesdale and the Shire horse by the fact that he is a clean-legged animal, and does not possess the extreme amount of feather that is so much sought after by breeders of these varieties. This circumstance may very possibly be accepted as an additional reason for the slowness which has characterised the headway made by the Suffolk in Canada, for it seems that the majority of agriculturists in this country are great advocates of hair and bone, and a general belief prevails that if hair is absent on a heavy horse’s legs, bone is certain to be deficient likewise. This, however, is not generally accepted by the breeders of Suffolks, who support their contentions by measurements, and assert that their favourite horse—that is, when his height at shoulder and general bulk are taken into consideration—is fully the equal of his heavier rivals as regards the amount of bone he possesses below the knee. As a case in point, Mr. Hume Webster refers to Mr. Alfred J. Smith’s champion stallion Wedgwood, who, at the time he wrote, was five years old, and measured 7 feet 10 inches in girth and 10½ inches

* Mr. Jacques is a breeder and importer of these horses, and has in the past two years import d direct from England 17 Suffolk Punch horses and 30 Suffolk sheep.

below the knee—a very considerable measurement, when it is remembered that there is no hair included in the dimension given. Wedgwood, it may be stated, was foaled in the year 1886, and was the winner of championship at the show of the Royal Agricultural Society of England.

“The Suffolk, moreover, is credited with a very enviable reputation for being a good horse so far as the soundness of his feet is concerned, and consequently it is claimed for him that he lasts longer upon the stones of a town than any other variety that is put to the same class of work. Longevity, indeed, is one of the chief claims that Suffolk breeders insist upon making for their horses. As an instance, it is stated in the Society’s stud book that at one of the exhibitions held by the Suffolk Agricultural Society, a brood mare, aged 37 years, was amongst the competitors, and at that time she was accompanied by a sucking foal. Julian’s Boxer travelled as a stallion for twenty-five seasons. The dam of Lofft’s Cupbearer, owned by the Rev. O. Reynolds, of Leabeach, was one of the sixteen foals which her owner had bred from her dam in sixteen years, and the mare from which Rising Star, the first prize horse at Leeds in 1861, was bred, was 22 years old when the colt was foaled. These are a few instances of the longevity and vitality of the Suffolk horse, and these could be multiplied many times were it necessary to do so, but enough has probably been written to convince the reader, if he were unacquainted with the fact before, that the breed now under consideration is a very remarkably long-lived and fruitful one.

“The extreme docility of the breed is another great point in its favour, as it is something for an owner to feel that he possesses a strain of horses that rarely, if ever, develop vice; but, on the contrary, are usually endowed with the sweetest of tempers and generosity. That the Suffolk is a very willing horse is rendered quite apparent by a visit to any farm upon which he is employed. Unlike many chestnuts, too, the natural gameness of the Punches is not neutralised by hot-headedness or vice of any kind.

“On the contrary, they are a somewhat phlegmatic dispositioned variety, though they possess an amount of courage which enables them to face and endure the hardest of work. Above all things, he is an agricultural horse; but, where pace and strength combined are required, as in the case of town work, he is equally at home. Beyond all question of doubt, he is the most nimble and active of all the so-called heavy varieties, whilst the Suffolk, for his size, is an extremely small feeder, and will flourish and look well upon an amount of food that would be totally insufficient for many other big horses.

“The head of the Suffolk Punch shows more breeding and quality about it than that of any other heavy horse, a very conspicuous feature being the eye, which is full of expression, yet mild and intelligent-looking. The neck is powerful and well formed, and the crest beautifully turned. The headpiece is well carried; the shoulders, which are very long, lie rather forward, this being desirable for the purpose of draught. The chest is wide and deep, the girth of the middle-piece being very considerable, while the body, as a whole, is long and substantially built. The back is very strong, the hindquarters long and heavy, and close coupled with the loin, the legs standing well under the body. The fore-legs—a very essential point, for however good an animal’s top may be, he will be worthless if he has no legs and feet to carry him—must be short and flat, possessed of plenty of hard bone, big and free from feather, whilst the pasterns are short and powerful with little hair on them, the feet being of a good size and truly shaped. In general appearance, the Suffolk Punch is very happily ascribed as being long, low, and wide, and this summary of his outline cannot possibly be bettered:—

“‘The Suffolk is an excellent mover, with a smart, quick step, a true balance all round at the trot, and a magnificent walker.’ As may be naturally supposed, an ultra-high flashy action is not desired, and it is naively added that ‘a horse weighing a ton, bending his knee up to his throat-latch, and striking the granite with his feet like a sledge-hammer, is not an exhibition that the Suffolk trader delights in.’ In fact, a Suffolk that is heavy enough for the largest dray is seldom, if ever, called upon for an exhibition of speed and high action. Even if he is only up to ordinary van work, he is never likely to be wanted to go more than seven or eight miles an hour, and this class of animal will never scale a ton.

“The Suffolk Punch is now being introduced for farm purposes by the Department of Agriculture and Stock, the first lot having been obtained from Mount Abundance, and we shall not be surprised to learn that before long the farming community will have appreciated the splendid qualities of the breed as active, enduring, docile animals, for the plough and the country wagon.”

Poultry.

REPORT ON EGG-LAYING COMPETITION, QUEENSLAND AGRICULTURAL COLLEGE, JUNE, 1920.

The third month's laying shows a good many changes in positions. The laying for the last week of the month has been exceptional. In some cases the number of eggs laid during the last week is more than a third of the month's total. This can be attributed to the very mild weather—a decided change from the frosts experienced in the early part of the month. Very few cases of broodiness have occurred, and the health of the birds has been excellent, there being no deaths to report for the month. The following are the best individual scores for the month:—E. F. Dennis (Black Orpington), C., 28 eggs; Dr. E. C. Jennings (White Leghorn), F., 28 eggs; J. E. Ferguson (Chinese Langshan), E., 24 eggs in the 30 days. The pens owned by E. F. Dennis and D. Fulton each laid 137 eggs in the heavy section. It is to be hoped that the birds will now continue in their improved output, and not resort to their former practice of reducing the yield as soon as a few days of indifferent weather occur. This has been particularly noticeable in the light section. The following are the individual records:—

Competitors.	Breed.	June.	Total.
LIGHT BREEDS.			
*G. Trapp	White Leghorns	119	339
*O. W. J. Whitman	Do.	125	338
*Haden Poultry Farm	Do.	123	333
Geo. Lawson	Do.	123	315
*S. McPherson	Do.	125	314
*J. D. Newton	Do.	112	313
*J. J. Davies	Do.	116	311
*W. Becker	Do.	109	306
*T. Fanning	Do.	110	296
*J. H. Jones	Do.	90	294
*J. M. Manson	Do.	126	290
*Quinn's Post Poultry Farm	Do.	115	289
*G. Williams	Do.	94	285
*H. Fraser	Do.	108	281
*W. and G. W. Hindes	Do.	92	277
*E. A. Smith	Do.	107	269
*Dr. E. C. Jennings	Do.	112	266
*S. W. Rooney	Do.	100	257
S. L. Grenier	Do.	107	256
A. J. Andersson	Do.	98	256
*Range Poultry Farm	Do.	99	255
*Mrs. L. Henderson	Do.	97	245
Thos. Eyre	Do.	76	241
*B. Chester	Do.	97	239
*Mrs. L. F. Anderson	Do.	109	233
*Thos. Taylor	Do.	88	232
*L. G. Innes	Do.	107	225
W. Morrissey	Do.	99	227
*N. A. Singer	Do.	76	223
C. M. Pickering	Do.	80	219
E. Chester	Do.	93	212
Mrs. R. Hodge	Do.	87	208
Avondale Poultry Farm	Do.	70	202
C. Langsbecker	Do.	96	201

EGG-LAYING COMPETITION—*continued.*

Competitors.	Breed.	June.	Total.
LIGHT BREEDS— <i>continued.</i>			
Miss E. M. Ellis	White Leghorns ...	99	193
H. P. Clarke	Do.	71	191
R. C. J. Turner	Do.	91	189
C. H. Towers	Do.	66	185
S. Chapman	Do.	66	149
W. D. Evans	Do.	39	146
H. A. Mason	Do.	44	128
C. A. Goos	Do.	43	125
HEAVY BREEDS.			
*R. Holmes	Black Orpingtons ...	129	375
*D. Fulton	Do.	137	359
*A. E. Walters	Do.	116	321
*R. Burns	Do.	111	315
*E. F. Dennis	Do.	137	311
H. M. Chaille	Do.	111	308
*E. Morris	Do.	119	299
*W. Smith	Do.	124	289
*T. Hindley	Do.	109	282
*R. Shanks	Do.	91	272
*Nobby Poultry Farm ...	Do.	107	269
*A. Gaydon	Do.	120	263
*R. B. Sparrow	Do.	97	245
*E. Oakes	Do.	124	245
G. Muir	Do.	52	217
J. E. Smith	Do.	109	217
R. C. Cole	Do.	111	213
*J. E. Ferguson	Chinese Langshans ...	78	212
Parisian Poultry Farm ...	Black Orpingtons ...	108	208
*E. Stephenson	Do.	92	200
Mrs. G. H. Kettle	Do.	110	198
*J. A. Cornwell	Do.	83	171
G. Flugge	Do.	50	98
Total ... ..	...	6,429	16,240

* Indicates that the pen is being single tested.

RESULTS OF SINGLE HEN PENS.

Competitors.	A.	B.	C.	D.	E.	F.	Total.
LIGHT BREEDS.							
G. Trapp	61	50	60	57	60	81	339
O. W. J. Whitman	54	50	62	52	59	61	338
Haden Poultry Farm	65	42	66	59	48	53	333
S. McPherson	55	50	53	53	60	43	314
J. Newton	67	47	55	37	48	59	313
J. J. Davies	54	53	49	64	43	48	311
W. Becker	53	57	58	45	37	56	306
T. Fanning	15	54	49	56	59	63	296
J. H. Jones	53	50	55	54	57	25	294
J. M. Manson	52	48	62	41	40	47	290
Quinn's Post Poultry Farm ..	59	55	58	46	34	37	289
G. Williams	43	52	47	49	56	38	285

RESULTS OF SINGLE HEN PENS—*continued.*

Competitors.	A.	B.	C.	D.	E.	F.	Total.

LIGHT BREEDS—*continued.*

H. Fraser	45	33	53	52	54	44	281
W. and G. W. Hindes	53	48	37	51	34	54	277
E. A. Smith	47	40	53	44	47	38	269
Dr. Jennings	42	55	37	43	38	51	266
S. W. Rooney	30	25	59	45	47	51	257
Range Poultry Farm	37	41	44	59	31	43	255
Mrs. L. Henderson	27	39	46	39	56	38	245
B. Chester	43	24	44	46	44	38	239
Mrs. L. E. Anderson	57	45	54	31	25	21	238
Thos. Taylor	54	44	27	38	32	37	232
L. G. Innes	12	35	55	33	56	34	225
N. A. Singer	34	36	42	55	29	27	223

HEAVY BREEDS.

R. Holmes	63	62	60	60	65	65	375
D. Fulton	65	62	51	43	63	75	359
A. E. Walters	52	54	31	72	49	63	321
R. Burns	53	30	66	46	65	55	315
E. F. Dennis	41	40	74	48	41	67	311
E. Morris	51	54	60	32	43	59	299
W. Smith	50	65	64	58	31	21	289
T. Hindley	49	62	53	63	24	31	282
A. Shanks	24	33	55	65	22	73	272
Nobby Poultry Farm	43	70	24	69	43	20	269
A. Gaydon	45	67	42	14	34	61	263
R. B. Sparrow	53	0	58	57	26	51	245
E. Oakes	33	48	60	17	48	39	245
J. Ferguson	26	42	29	43	52	20	212
E. Stephenson	59	41	32	40	19	9	200
J. Cornwell	31	59	26	0	17	38	171

CUTHBERT POTTS,
Principal.

MORE MUSCOVY DUCKS SHOULD BE RAISED FOR THE TABLE.

By R. T. G. CAREY (Muscovy Breeder), Beerwah.

One of the most neglected lines in present-day poultry culture, is the decided lack of appreciation of the household value or the use of these aquatic domestic birds for table purpose—Muscovy ducks.

The raising or the breeding of muscovy ducks with such abundant flesh for market purposes is proved to be a highly profitable investment, as well as a means of economising the butcher bill, also one of the most economical primary lines of poultry culture which is extremely easy to increase to a large scale whether on free range or by close pen method. Duck culture may be specialisation, but has, in many cases, become a remunerative factor in conjunction with dairying, farming, and poultry pursuits, inasmuch as it is natural to presume that poultry-keepers know that choice muscovies are in great demand among those who like good living; and it is also natural to presume that those who freely eat other kinds of poultry are led to choose those birds for the table-d'hôte and home table. But, so far from that being the case, a very large proportion of our population never have tasted either fowl or duck.

Do not the foregoing statements show the extent of the neglect there is in raising those domestic waterfowls?

I have just concluded a country tour, during which I visited markets, made inquiries from fellow-travellers of all grades of callings, from the farmer and the humble cottager, finding poor supplies at the markets, the "man-on-the-land" uninterested, and the cottager lacking enthusiasm, in poultry culture. The waste of table offal in quantities wilfully dumped away would maintain a pen of birds, fowls, or ducks, it being thus turned into profit represented by a well-fatted dressed carcass on a dining table, to say nought of the delicious flavour of the duck.

What! Is not such great neglect and want of interest bad, when with such a magnificent climate and extensive country as ours we are so slimly represented in duck culture?

Wake up! Arise out of your drowsy slumber; begin and appreciate the advantages of growing a few ducklings for the family table.

On the farm or in the back yard they can be raised, cheaply and easily; the wife, maid, or hireling may easily feed and water the dozen ducklings. The birds adapt themselves extremely well, both in small quarters as on broad acres.

Muscovy ducks for the family table will give the most satisfaction if hatched late in the season, so that the care necessary for them and the attention that may be required for chicken-rearing will not clash. Furthermore, there will be more waste food for late ducklings than for the early ones, and young juicy ducklings for Sunday's dinner will be available when cockerels are out of season, and ducklings grow so quickly.

Should you contemplate hatching ducks for the home table, this is less difficult than hatching for commercial purposes, and hens could perform the work, as the fewer number are more easily attended to, there being no condition of trade supplies or fanciers' demands to hamper one's whole time.

Muscovy ducklings, in foraging, hunt principally for animal food; they take an occasional nip at any tender green herb in their way; and when insects and worms become scarce they will turn to the herbage more eagerly. As long as animal or insect food is abundant on their range, and they get a little mash morning and evening, a few ducklings in a garden will do very little damage to vegetables; but beware that you do not let elderly ducks thereon, because results would be disastrous.

TO PREVENT IRISH BLIGHT IN POTATOES.

Mr. A. H. Benson, Director of Fruit Culture, in a communication to the Press in July last, on the prevention of the above fell disease of the potato, particularly emphasised the necessity of prevention rather than of cure. In the issue of December, 1919, of this Journal, we drew attention to a recommendation in the "Agricultural Gazette," England, of a spraying mixture of a 1 per cent. solution of either burgundy or bordeaux mixture to prevent potato blight. The most successful treatment was found to be spraying with a 1 per cent. mixture before any disease appeared; then using a 1½ per cent. mixture in about a fortnight if it appeared, followed by a 2 per cent. application if the disease becomes persistent. Many English farmers, however, use the 1 per cent. solution all through the season.

Mr. Benson, referring to the appearance of Irish blight in the coastal districts, said that he desired to direct the attention of potato and tomato growers to the necessity for taking every possible precaution against this trouble, the recrudescence of which has been brought about by the prevailing muggy weather. Care is specially necessary, because the main planting season for potatoes will commence at the end of this month, or in the following months, according to the locality, and nothing should be omitted which would tend to prevent the ensuing crop being affected. Irish blight is a disease that can much better be prevented than cured. The known preventive measures have been proved to be efficacious, as was shown in Great Britain during the recent war. In another instance at Circular Head (Tasmania), one planter who treated his seed potatoes, and sprayed the crop systematically harvested a crop of seven tons to the acre, and on the other side of a two-rail fence, another grower, with exactly the same soil, seed, and conditions, had his crop attacked, and did not harvest a single tuber.

With regard to the present outbreak, Mr. Benson warns growers to take special care to pick over all potatoes carefully before sending them to market. He points out that, if after arrival at the market the potatoes are found to be infested, they will be picked over at the grower's expense. The diseased potatoes will be destroyed, and the balance will only be permitted to be sold for town consumption under special conditions. It will, therefore, be very much to the advantage of the grower to see that nothing but sound potatoes or tomatoes, are sent to market. If they are picked over on the farm, the diseased tubers can be fed to the pigs.

Botany.

NOTE ON VARIATION IN THE BARK OF TWO COMMON EUCALYPTS.

By C. T. WHITE, F.L.S., Government Botanist.

One of the commonest Eucalypts of South-eastern Queensland is *Eucalyptus hæmastoma* var. *micrantha*, commonly known as either the "White" or "Scribbly Gum," the latter given on account of the peculiar scribble-like markings that occur on the trunk and seem more or less confined to this tree, and caused probably by insect or mite attack. The tree exhibits a certain amount of variation in the character of its bark, the most usual type being a pure "candle" white with the characteristic scribbings, the outer dead bark being shed in thin strips or patches as in fig. 1. Often growing alongside the trees with the white bark are others with a bark indistinguishable from that characteristic of *E. tereticornis*, "blue gum" of Queensland or "forest red gum" of New South Wales; such a tree is illustrated in fig. 2. Rarely the outer dead bark may be persistent on the trunk for a considerable distance, but eventually comes off in the characteristic strips or patches.

In January, 1919, when attending the schoolboys' camp at Toowoomba for the purpose of lecturing on native plant life, I was puzzled about the identification of a eucalypt known to everyone locally as "stringy bark." A good series of specimens was obtained and I was surprised to see that from leaves, flowers, and fruit (ordinary herbarium specimens) it was quite impossible to separate the tree from *E. hæmastoma* var. *micrantha*. Last January (1920) I again visited the schoolboys' camp at Toowoomba, and made a special feature of studying this tree and failed to find the more typically-barked form in the locality, all the trees observed carrying a typical "stringy bark," leaving the topmost branches bare. To all intents and purposes, the tree is a typical stringy-bark, and goes under that name in the district. It is not customary to name distinct varieties according to the nature of the bark, and the practice is not one that can be generally followed, especially among eucalypts, where often considerable variation exists in the bark of a single species. In this case, however, where there is a wide difference, and all the trees in a certain locality bear a bark markedly different from that of the common form, one feels justified in giving a distinct varietal or specific name, and for the Toowoomba tree, I would propose the name:

Eucalyptus hæmastoma, sm. var. *inophloia* n. var. "Gum-topped stringy-bark."

Trunk and main branches clothed with a persistent, fibrous bark; leaves, flowers, and fruits as in the variety *micrantha*. Habitat: Ranges about Toowoomba, Queensland. C. T. White.

For the past few years, as time permits, I have been paying some attention to the eucalypts of the Brisbane district, and have found the narrow-leaved blue gum (*Eucalyptus seeana*, *Maid.*) to be fairly well distributed over the area. As a general rule, in the character of its bark this tree can scarcely be distinguished from *Eucalyptus tereticornis*, and often in appearance is intermediate between that species and *E. propinqua*, but during the course of collecting trips I have met with one tree growing on the Chermside hills (about 6 miles from Brisbane) bearing a thick, light, flaky, persistent bark almost up to the topmost branches; but in this case, knowing only a single tree, one does not feel justified in naming it as a distinct variety. Some botanists may take exception to the naming of the new variety of *E. hæmastoma* here proposed, but distinct variation in bark has surely just as much right to varietal value as the presence or absence of hairs on either leaves, twigs, or flowers, which variable feature is often used as one of distinct varietal value.

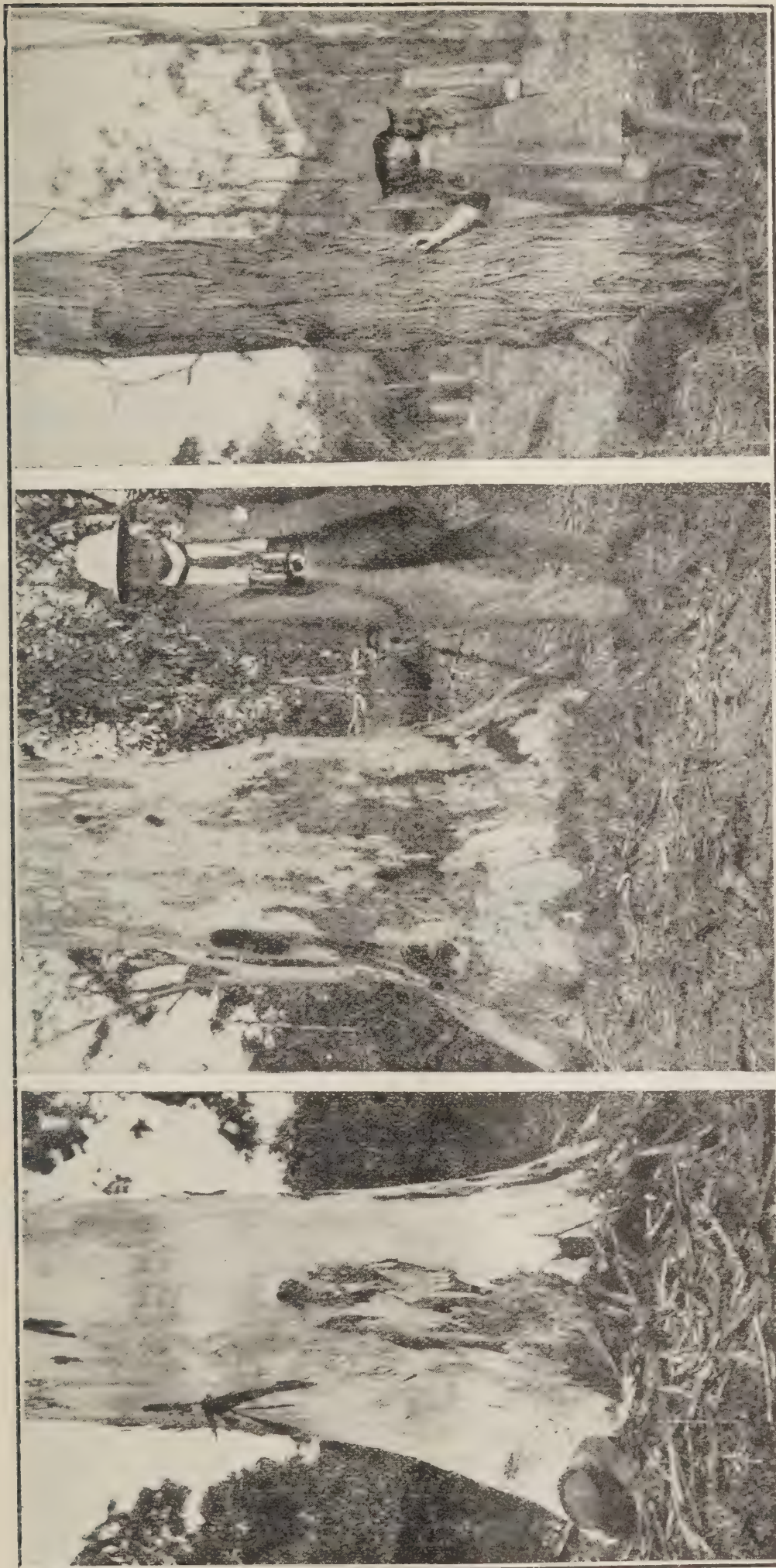


PLATE 3.

1 AND 2.—*EUCALYPTUS HÆMASTOMA*, VAR. *MICRANTHA*. "WHITE" OR "SCRIBBLY GUM," SUNNYBANK, NEAR BRISBANE.
 3.—*EUCALYPTUS HÆMASTOMA*, VAR. *INOPHLOIA*. "GUM-TOPPED STRINGY-BARK," TOOWOOMBA.

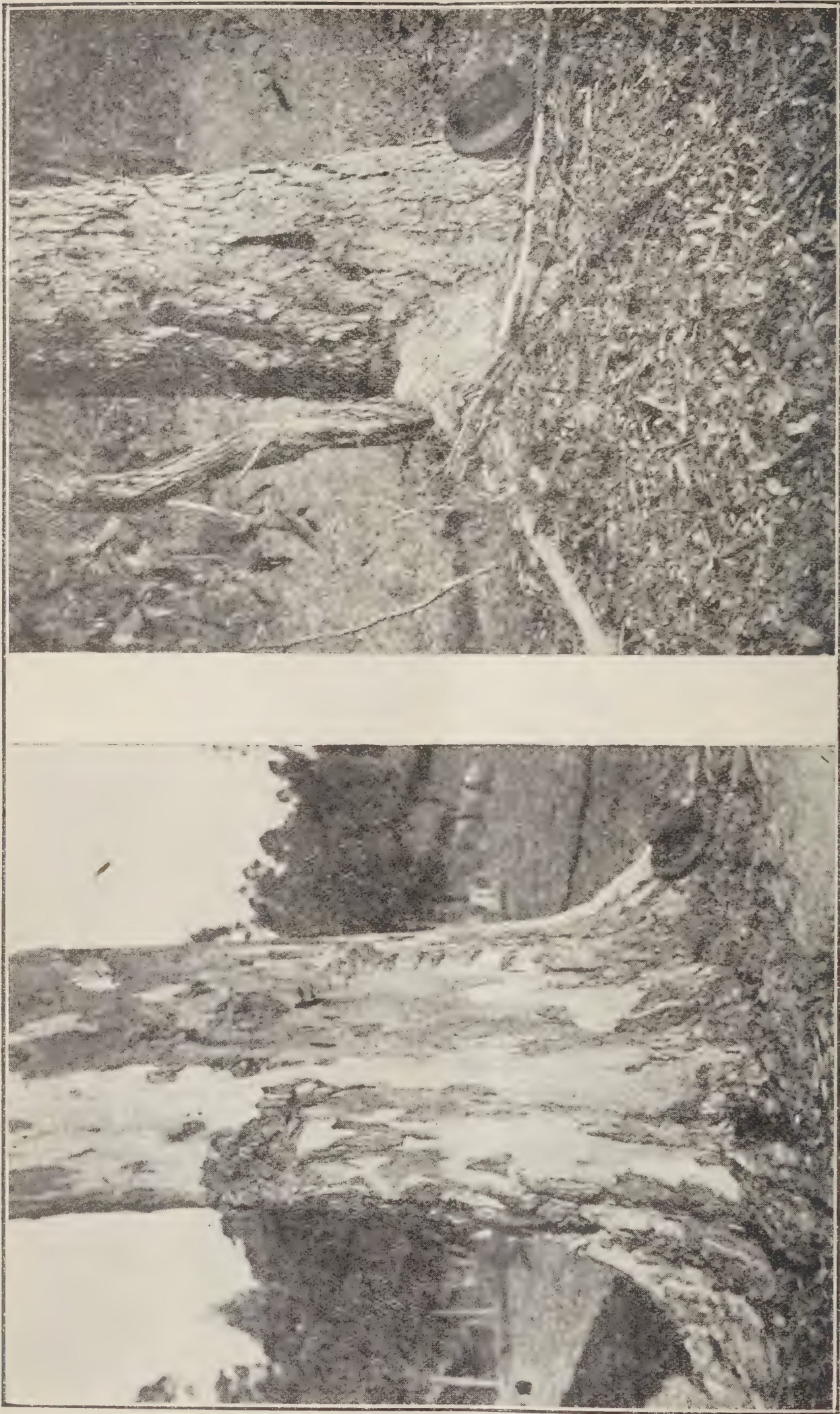


PLATE 4.

1.—*EUCALYPTUS SEEANA*. NARROW-LEAVED BLUE GUM, BRISBANE RIVER.

This is the normal and characteristic appearance of the tree.

2.—*EUCALYPTUS SEEANA*, CHERMSIDE, NEAR BRISBANE.

This tree carried its flaky bark almost to the topmost branches, and is a remarkable variant from the type.

Science.

THE ERADICATION OF PRICKLY-PEAR.

By W. S. CAMPBELL, Retired Director of Agriculture, New South Wales.

Some years ago, whilst I was in charge of the Forestry Department as well as the Agricultural Department in New South Wales, efforts were being made to eradicate the prickly-pear, which had then spread over a considerable area of land and was gradually advancing and causing the land to become useless. Spraying with poisons (arsenic, scrub exterminator, and others), a machine to smash up the pear, heavy rollers, and burning were all being tried more or less effectively. It seems to me that the only reliable work was effected by fire; but, of course, unless timber was plentiful and labour available to cut and heap up the pear, this was impracticable. It was adopted most effectively here and there on a small scale.

In one district (Gloucester), where the pear was scattered about in small clumps here and there, the Forester in Charge, the late Mr. Rudder, who was very keen on getting rid of the pest, coped with it satisfactorily and, I believe, eradicated the pest from his district, by causing every particle of pear he could discover to be burnt. There was abundance of firewood available in the district. Whether the pear has been allowed to spread since Mr. Rudder's death, I do not know.

Various methods to eradicate or prevent progress of the prickly-pear have been experimented with in Queensland, I believe, but ineffectively—the cochineal insect (and most unlikely to be of any use whatever), sprays of various kinds (kerosene flare and others), including burning off, which is quite impracticable in most places affected.

The one and only method which, I am convinced, will keep the pear in check, and ultimately eradicate it, is the application of intense heat, which I feel sure could be practically applied. The heat “formed by the combustion of 1.7 volumes of oxygen and 1 volume of acetylene,” 3,482 degrees C., applied by means of a large specially constructed blow-pipe, or even a heat of 1,000 degrees C. to the prickly-pear, would melt it away like wax—plant, seeds, roots, and all.

This may seem to be, perhaps, a visionary project, but it is not so visionary as must have been that of the application of heat to work machinery, the invention of the aeroplane, or the application of electricity to the telegraph, the telephone, and domestic requirements.

To eradicate satisfactorily the prickly-pear in Queensland, or even to check its further progress, should be worth a million or even two million pounds sterling, and if the means suggested shall prove effective, although perhaps expensive, it will be worth while adopting it.

CANE PLANTING IN JAVA.

“The South African Sugar Journal” for May, 1920, states that Java is planning to raise 156,971 hectares* (about 353,184 acres) of cane in 1920. In 1919 it was 137,031 hectares. The number of factories in operation in 1919 was 180; the year previous, 186. The sugar output for 1919 was 1,340,926 tons, which was 24.6 per cent. less than in 1918, when it was 1,778,207 tons. Thus, the 1920 increase will be 14.6 per cent. over that of the previous year.

* 1 hectare = about 2½ acres.

Natural History.

FLYING FOXES.

LIFE HISTORY, HABITS, &c.

By H. TRYON, Government Entomologist.

Our five species of flying foxes are apparently identical as regards their general developmental history and habits of life.

Being largely nocturnal, and not thriving long under conditions of confinement, the average duration of their lives, the age when breeding is commenced, the period of gestation, the total of their individual progeny, are matters that have eluded observation, although these have an important economic bearing in considering the problem arising from their depredations.

The evidently have, as a rule, however, but a single young one. This after birth is transported by the female, clinging meanwhile to its under-surface, the mother animal suckling it in the ordinary way.

Both sexes are principally nocturnal, and remain stationary during the hours of daylight, hanging suspended with the head downwards, from vine or tree-branch, by means of the toes armed, as they are, with sharp curved claws. Meanwhile, the ample wings of the animals (webs that unite their long fingers, and the fifth of these, with the side of the body and inner face of the hind leg on each side), are folded across their under-surfaces.

During this time of rest they manifest a striking social habit, living in colonies of ten—as regards numbers—of prodigious size, comprising in fact, many thousands of individuals.

These “camps” occur in dense scrubs, or on islands, or on the shores of estuarine waters, and in other spots also where, too, there may be a rich growth of mangroves or other trees. The spots that are usually selected for their camps are where quietude reigns, as in the gullies of our tree-clad coastal ranges.

Whilst thus inactive, they hang packed together side by side, in continuous or little broken rows along the length of branches or vines; the masses of these huge bats not only bend downwards their perches, but oftentimes cause fairly large branches to yield to their combined weight and break off. Moreover, in long occupied camps, the tree-tops they occupy thus soon become also almost denuded of their foliage.

The population of these large camps, again, is not always constant, since at certain times of the year they may originate secondary colonies that are temporarily established in more or less remote spots.

Although a single camp may serve to people an area of many square miles, it may happen that more than one large camp may occur at no great distance apart from another. Two such camps were met with “below the Range,” one near Helidon, the other near Blackfellow’s Gully.

The smaller or secondary camps usually occur nearer settlements than do the principal ones, sometimes, indeed, in the heart of the coastal towns, especially where clumps of bamboos or large umbrageous trees are to be met with, and fruit-yielding gardens are not far distant.

Further, individual flying foxes, or small groups of two or three, may remain during the day in the trees that have yielded them fruit, and under these circumstances, though large objects, looking (as they do when posed as asleep) so unlike any animal, their presence is easily overlooked.

In their camps, however, they are never all sleeping at one time. Then they may be observed at times shifting their position, moving their heads to one side, as if listening, scanning the prospect with their bright eyes, or detaching one of the legs by which they are supported to scratch any allay the irritation of some nyctirebid parasite.

The neighbourhood of a camp of flying foxes is, as a rule, first revealed by the strong unpleasant odour that emanates from certain glandular organs they possess; and, on a nearer approach, their shrill cries further compel attention.

Although apparently at rest, they are all evidently very nervous and wakeful, and hence take wing, rising into the air *en masse* on the least disturbance—the firing of a gun, or the shying of a stone, for instance—and, being able to see by day as well as by night, they, on these occasions, move off to a considerable distance before settling down again.

At sunset, however, they habitually leave their camps, and with such concerted action and promptitude as regards the main body, that the sky, when they rise and issue forth, is almost darkened by their presence; and moreover, although the individual flying fox travels noiselessly through the air, in this combined movement, a sound is produced that has been likened to the beating of the air by some huge fan-like instrument.

But although setting forth together, they soon separate into little bodies that usually pursue a direct course, high aloft, like some big birds speeding to their roost or to their chosen feeding grounds.

Wide expanses of ocean, as between mainland and island, may even thus be passed over.

The fruit-yielding trees of scrub and forest are now their principal quest, and they appear to favour the indigenous figs of one kind or another growing, not only in the scrub lands, but also when planted in our streets and gardens.

They are also very fond of honey-yielding flowers, especially those of our Eucalypts, and one may see the ground beneath one of these trees, when in bloom, freely strewn with leaves and branchlets after one of their nocturnal visitations. (*Note.*—This appetite for honey, exhibited apparently by all our flying foxes, and that may be availed of for exhibiting a poison fatal to the consumer, is a feature that the less common of our South Queensland flying foxes especially manifests.)

The flying fox's food is contributed by the product of many of our cultivated fruit trees, and its exercise of its partiality for these is the gravamen of the charge against it. It specially favours those that are sweet and luscious; but notwithstanding, the members of the citrus tribe, though possessing this quality, are often avoided by them. Their dietary with regard to cultivated fruit is, however, very wide. On occasion, these fruit bats will resort to the surface of the land and partake of pine-apples, and an instance of their attacking ripening maize is well authenticated.

This habit of attacking cultivated fruit is especially manifested when the native sources of supply fail, as during periods of protracted drought, and it is then that complaints regarding the flying fox's depredations are principally voiced.

This fruit-destroying habit may be exercised to a very serious extent, at times even an entire crop being removed by them. Moreover, the entire eastern portion of the State at one time or another witnesses their ravages in orchard or plantation.

It is, again, a common remark that their depredations are yearly becoming more pronounced, whilst the extent of country that witnesses them is ever widening, this fact proving that they are migrating to previously unvisited "pasture grounds." This is accounted for by the destruction of their "haunts," and the felling of their natural food-yielding wild fruit trees to meet the needs of further and further settlement on the land. Temporary extension of their range of occurrence is also to be explained by temporary uncongenial meteorological conditions.

The damage that they occasion is not confined to what they consume only; they only chew and then reject a great deal of fruit, leaving this either upon the tree yielding it, or on the ground beneath. At the same time, although so nice in their requirements in regard to the condition of fruit as to ripeness and flavour, especially when the yield is generous, they will at all times eat unripe fruit, as well as even the sour acrid immature mango. In addition to consuming fruit, they will also damage it with their sharp claws in clambering amongst it.

When about to feed in a fruit tree, and having alighted upon it, they clamber all over its branches, in order to explore them to find what they are seeking and exercise their choice. In this procedure, they grip the branches with the stout curved claws that terminate their thumbs, reaching forth and fastening on to one object after another with their aid; and not using in these procedures the claws of their well-developed feet only. They also expand and make use of their wings, when

special movements in the tree-tops necessitate this. Thus they are veritable acrobats when so engaged.

Then, again, on these occasions the different individuals quarrel and fight with other flying foxes that they may meet, and uttering meanwhile their ear-splitting shrieks. Love quarrels, as well as mere cupidity—as it seems—impel them to thus vociferate.

Generally they feed on the tree that is yielding them the fruit that they have discovered, rejecting apparently—in the case of wild figs or stone-fruits at least—parts that they cannot digest (seeds, &c.). However, the process with them is evidently soon perfected.

At times they carry fruit bodily away, at least for some distance.

By the eversion of their inner membranes, the flying fox's nostrils are very protuberant, and are at the same time separated by a groove. This eversion of the inner sensitive part, evidently too greatly enhances their sense of smell, and as one may infer from observation, also their sight, too, at night is very acute. This circumstance doubtless contributes to the discovery of the existence of the definite fruit-bearing trees they visit, and not only their inherited experience.

All night long, successive visits may be made to a tree once found, either by the same animals by way of repetition, or by different ones that are attracted to the spot, especially by the noises emanating from the earlier depredators.

With the approach of dawn, the animals leave the orchards or individual trees, and repair to the camps or secondary settlements, whence on the previous day they originated, prepared towards nightfall again to come forth and commit further havoc.

The myriads of flying foxes met with in the large camps, the voracity with which they feed, and the comparative paucity of wild fruits, originally suggested to the late G. Krefft, amongst other naturalists, that these fruit-eating bats share, in some respects, the habits of other *Chiroptera*, and partake to some extent of an insect diet. I am not, however, aware that any facts have been ascertained to support this opinion.

The sickness to which, under natural conditions of life, they are subject have not been ascertained. In January, 1905, a very great fatality came under the notice of an observant correspondent (L. Franzen) as occurring in a large flying fox camp at Helidon that he frequently visited. In fact, the area occupied was unapproachable owing to the stench arising from those animals that had already died and become corrupt. This, at the time, he attributed to the very high temperature of the air that had occurred on 1st January of that year.

POISONING WHITE ANTS.

Many methods of destroying white ants have been proposed; some of value, others useless. In the "Pastoral Review" for last June, we find the following remedy, advocated by Mr. W. W. Froggatt, New South Wales Government Entomologist, for the protection of timber against the ravages of these destructive pests:—

"A poison bait, generally effective, may be made by the admixture of an ounce of arsenic to a pound of treacle, but I would recommend that arsenite of soda (in similar quantity) be substituted for that ingredient. This should be dissolved in hot water, and then mixed with the treacle. The bait is poured into the woodwork of floors or joints which are not going to be removed, but which may be harbouring the ants; it percolates through any damaged wood, and coats it with poison. A mixture of 1 oz. of paris green and 1 lb. pollard, brought up to the consistency of putty by the addition of a little sweetened water, has also been found useful. This should be forced into the wood it is not desired to remove."

Mr. J. C. Brünnich, Queensland Agricultural Chemist, gives the following suggestions on White Ant Destruction in the case of fence posts:—

"If the posts are not hollow, it is sufficient to clear away the soil from the posts to the depth of about 12 inches, and then liberally sprinkle the soil near the posts with ordinary arsenic, and fill up the hole. If the posts are hollow, they will have to be bored to reach the hollow core, and the arsenic can be put in by mixing it with water, or by making a solution by boiling the arsenic with an equal quantity of washing soda. As a rule, solution is not required, and the dry arsenic is found quite effective. At any place where the earth-covered tunnels, in which the white ants work, can be broken, and a pinch of arsenic introduced, all the ants will be destroyed in a short time."

General Notes.

MEGGITT LIMITED.

The Company has placed a range of specialised stock food and tonic meals on the market in response to numerous requests received from their Australasian clientele for a perfectly balanced ration which would eliminate all trouble and doubt of mixing.

It has been conclusively proved by both practical and scientific tests that foods ground give better results than unground. Meggitt Limited have handled this matter with their usual thoroughness of detail, and are supplying foods which have no superior in this regard.

All foods are ground to absolute fineness and contain the requisite proportion of protein, carbohydrates and fats essential for their different needs.

Meggitt Limited's slogan is that "by results is cheaper." To establish this claim they have installed the most up-to-date grinding and mixing plant of any food manufacturer in the world. All the ingredients utilized in the manufacture of specialised stock foods and tonic meals are of the very highest quality and must measure up to their standards before being passed on to the manufactory department.

Each and every component part of the raw material is submitted to their chemists and undergoes rigid laboratory tests before being accepted as suitable for preparation of stock foods and tonic meals.

Included in the range of tonic meals is a parasitic preventive which is invaluable for worm infestation of the stomach and intestines. It also performs the important function of eradicating so-called "blood worms." The regular use of tonic meal for horses will prevent colic, gripe, and impaction.

By maintaining dairy cattle in good health their milk yield is materially increased. Tonic meal for cattle by increasing the general health of your stock and preventing such ailments as dry bibble, impaction of the third stomach, and indigestion is necessarily a boon to dairymen.

Pig-owners are also catered for with pig tonic, which should be in all piggeries. It prevents fermentative changes in the stomach and their attendant troubles. (As prevention is better than cure) pig tonic will fortify your pigs against the ravages of disease, and is an excellent preventative for those common swine ailments, pneumonia and swine fever.

A long felt want by the poultry farmers is supplied in tonic which benefit the entire system, builds new tissue, and rectifies many causes of poultry diseases.

All stockowners confronted with the serious problem of increased cost of production should investigate stock foods which are the ideal concentrate and used as directed will result in increased production.

LONDON QUOTATIONS FOR JULY.

COTTON.—23.87d. per lb.; Rubber, Para, 2s. per lb.; Rubber, Plantation, 1s. 11½d.; Hemp, dull, £55 per ton; Copra, £44 5s. per ton. Linseed oil is worth £79 10s. per ton.

TANNING SHEEP SKINS.

An American recipe for tanning sheep skins is to apply eight parts of common salt and one part of powdered alum to the flesh side of the pelt. After rubbing in, allow the skin to lie flesh side up on a floor for eight or nine days, and then hang up in the air for a further four or five days until dry. As soon as dry, work the hide with the hands until the inner layers crack and peel off, leaving the soft pelt, with the wool attached. Besides preserving the skin the alum and salt set the wool in the hide.

TO COMBAT RED AND BLACK ANTS.

It is said that if a line of Keating's Powder is drawn on the floor round the legs of a table, no ant will come near it, and should one once come into contact with the powder, that ant dies. At all events, the remedy is simple and worth trying.

UP-TO-DATE ROAD MACHINERY.

In this issue, on page XXI, Messrs W. Lovelock and Company, Limited, the road machinery and road implement specialists, 210 Roma street, Brisbane, invite representatives of municipalities and shire councils who are visiting Brisbane for the Local Authority Conference to call and see their display of road machinery and road implements in their showrooms, 210 Roma street, just past the railway gates.

Messrs. Lovelock and Company are sole agents in Queensland for the All-Steel Western Reversible Road Grader and Western line of Road Machinery.

The Western Road Grader is a very popular grader amongst shire councils, and it has proved itself the king of all graders, being built of all steel. It is a particularly durable road machine, and will stand heavy work and heavy strains, being a reversible grader, fitted with all the latest improvements. It is a grader that can be used under almost every condition. The many advantages of using the Western Road Grader are no doubt well known to most Local Authority representatives. An inspection of the Western Road Grader and Road Machinery will, we are sure, prove interesting.

The Western Road Grader has been supplied by Messrs. W. Lovelock and Company to a large number of Shire Councils and Municipalities in this State. In many cases repeat orders having been received, as a result of the economical working of the first road grader supplied. Messrs. W. Lovelock and Company will be very pleased indeed to give all information with regard to the capabilities of the Western Road Grader and Road Machinery, and will be pleased to have a call from all Local Authority representatives.

SOCIETIES, SHOW DATES, Etc.

BLACKALL.—The Barcoo Pastoral Society. Secretary, W. P. Tilden. Show dates: 13th and 14th July, 1920.

KAIRI (*via Cairns*).—The Kairi Farmers' Progress Association; Secretary, G. H. Hemming.

NORTH PINE.—The Pine Rivers Agricultural, Horticultural, and Industrial Association. Secretary, G. M. Armstrong. The Annual Show of the Association will be held at Lawnton on 3rd and 4th September, 1920.

PHILPOT CREEK, VIA GAYNDAH.—Mundowran Pocket Farmers' Association. Secretary, A. J. C. Mathieson.

WELLINGTON POINT.—Wellington Point Agricultural, Horticultural, and Industrial Association. Secretary, John Burge. Previous Show date postponed to 28th August.

PRODUCTIVITY OF PERENNIAL COTTON PLANTS.

Mr. D. Jones mentions ginning the cotton obtained from Mr. William Howard, Fairfield, Bundaberg, from one plant, six years old, as yielding 8½ lb. of seed and 5½ lb. of lint, the proportion of lint being 37½ per cent. As this fibre fully equalled some valued for the Agent-General recently, in Liverpool, as being worth over 4s. per lb., it follows that the value of cotton produced on this plant exceeds 20s.

Sown 12 ft. by 12 ft. apart, there are 302 shrubs to the acre. The fibre represents 5½ months' picking for the half-year. In January, 1921, it is estimated that with the next harvesting the plant will establish a year's record. The quantity of seeds obtained from the shrub (213 to an ounce), 29,820, is sufficient to sow about 30 acres 12 ft. by 12 ft. apart.

Answers to Correspondents.

THE SWORD BEAN.

Mr. BIDDLE, Sunnydale Farm, Tamaree, asks—

1. Whether the sword bean (dwarf or climbing) can be used for food purposes.
2. Whether the nodules on the roots of the plants, and which are very large, could be collected and used to inoculate fresh ground for other leguminous crops.
3. The name of a bean, which he thinks is the velvet bean, which bears great bunches of beans like dark bananas.

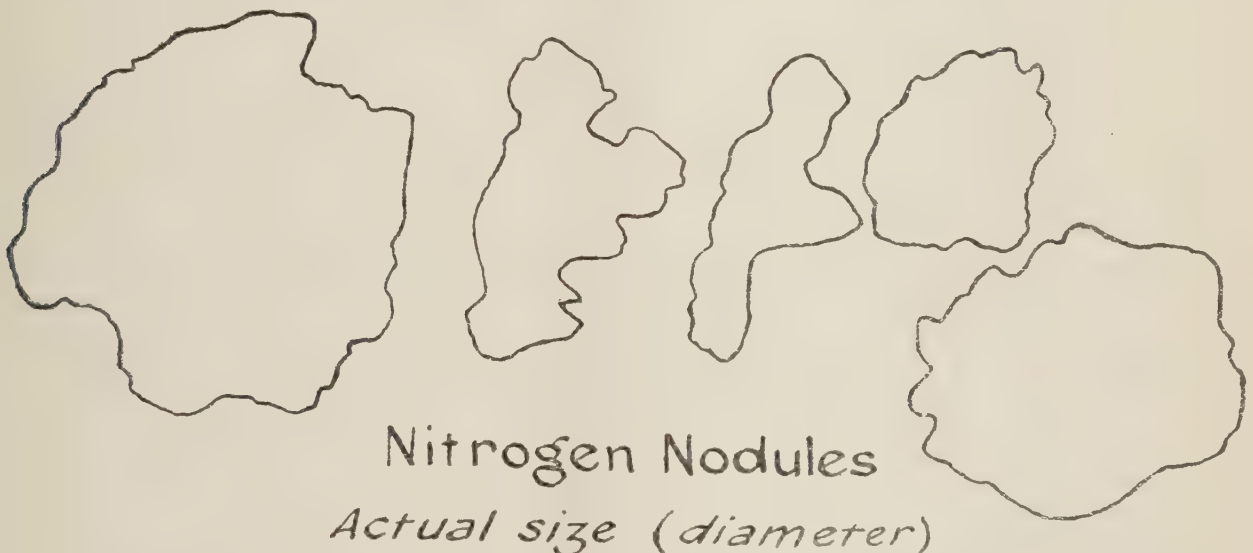
The Government Botanist (Mr. C. T. White) has replied as follows:—

1. The sword bean is edible as a green bean, if treated in the same way as ordinary french beans, but for this purpose must be used when very young. The seeds can also be used when fully formed, but not hard, in the same way as lima or broad beans. The ripe seeds are also said to be edible, but I think care must be exercised in eating the bean in any way, as reports commonly come in of people having been made very ill by eating them, whereas other people have eaten them over and over again without any ill effects following.

2. With a plant like the sword bean, gathering the nodules and distributing them over the ground would not be very satisfactory, but the whole plant should be ploughed or dug in and returned to the soil, when the nitrogen gathered and stored by it would be available for any succeeding crops, leguminous or otherwise.

For inoculating fresh ground, soil taken from a plot which had previously grown these legumes should be taken and applied to the fresh ground where the bacteria become available for those leguminous crops, such as lucerne, beans, peas, &c., but for such crops only.

To understand this, we must know something of the life history of these bacteria which live in the nodules that occur in the roots of leguminous plants.



These bacteria are able to fix the free nitrogen of the atmosphere, and pass it on in the form of nitrogenous compounds which can be utilised by the associated plants as food, this source of nitrogen not being otherwise available to them. On the other hand, the bacteria receive from the green plant the carbon, minerals, and water required for their development, this being a case of true symbiosis, *i.e.*, two different organisms living together, each to their mutual advantage.

These nodule-producing bacteria occur in most soils, making their way through the epidermis into the interior of the root, where they induce an exuberant growth of tissue, resulting in the formation of the well-known root nodules. After a time the bacteria, which on first entering the root tissue are minute rods (*bacilli*), change their shape and increase considerably in size, and are then termed *bacteroids*. In this form they are gradually absorbed by the green plant and transformed into nitrogenous compounds, which are either utilised by the plant as food, or stored away as reserve material. Numbers of them, however, are returned to the soil, thus providing for the infection of other leguminous plants. It will easily be seen how it comes about that leguminous plants are so valuable as green manures, after the nitrogen stored in them, mainly by bacterial action, is returned to the soil on their decay, when it becomes available to the crops that may afterwards be grown in the same area.

3. The bean referred to is the velvet bean (*Mucuna pruriens* var. *utilis*), commonly grown as a green manure.

SOUTHERN FRUIT MARKETS.

Article.	JULY.			
	Prices.			
Bananas (Tweed River), per double case	10s. to 28s.
Bananas (Queensland), per double case	22s. to 30s.
Bananas (Fiji) per double case	10s. to 28s.
Lemons, per case	3s. to 10s.
Mandarins, per case	12s. to 15s.
Oranges (common), per bushel case	4s. to 6s.
Oranges (Navel), per bushel case	4s. to 12s.
Passion Fruit (Victorian), per case	14s. to 22s.
Pineapples (Queens), per double case	16s. to 20s.
Pineapples (Ripley), per double case	14s. to 16s.
Pineapples (common), per dozen
Tomatoes, per quarter case

PRICES OF FRUIT—TURBOT STREET MARKETS.

Apples, Eating, per bushel case	...	...	...	...	10s. to 15s.
Apples, Cooking, per bushel case	...	...	...	...	11s. to 14s.
Bananas (Cavendish), per dozen	...	...	...	...	3d. to 10d.
Bananas (Sugar), per dozen	...	...	...	...	4d. to 9d.
Citrons, per cwt.	...	...	...	...	14s. to 15s.
Cocoanuts, per sack	...	...	...	...	£1 5s.
Cumquats, per quarter case	...	...	...	...	5s. to 6s. 6d.
Custard Apples, per case	...	...	...	...	3s. to 6s. 6d.
Gooseberries, per quart	...	...	...	...	1s.
Lemons (Lisbon), per half bushel case	...	...	...	...	10s. 6d. to 12s.
Mandarins, per case	...	...	...	...	12s. to 18s.
Oranges (Navel), per case	...	...	...	...	10s. to 16s.
Oranges (other)	...	...	...	...	7s. to 14s. 6d.
Papaw Apples, per case	...	...	...	...	2s. to 16s.
Passion Fruit, per half bushel case	...	...	...	...	5s. to 8s.
Peaches, per quarter case	...	...	...	...	...
Pears, per quarter case	...	...	...	...	12s. 6d. to 17s. 6d.
Pineapples (smooth), per dozen	...	...	...	...	7s. to 12s.
Pineapples (rough), per dozen	...	...	...	...	8s. to 9s.
Pineapples (Ripley), per case	...	...	...	...	...
Strawberries, per dozen boxes	...	...	...	...	12s. to 25s.
Tomatoes, per quarter case	...	...	...	...	3s. to 7s.

TOP PRICES, ENOGGERA YARDS, JUNE, 1920.

Animal.	JUNE.			
	Prices.			
Bullocks	£19 to £22
Bullocks (Single)
Cows	£13 12s. 6d. to £17
Cows (Single)
Merino Wethers	50s. 6d.
Crossbred Wethers	43s. 6d.
Merino Ewes	32s. 6d.
Crossbred Ewes	44s. 6d.
Lambs	37s. 3d.
Pigs (Backfatters)
Pigs (Light Bacon)
Pigs (Porkers)	70s.



A Field of Giant Kangaroo Rape

JUST ARRIVED!

Giant Kangaroo

*The Food
for
SHEEP!*

RAPE

*The Food
for
SHEEP!*

A VALUABLE WINTER CROP for pasturing Sheep—will fatten three more to the acre than any other variety. Easily cultivated. Strong rapid grower, producing an abundance of highly nutritious green feed, greatly relished by all stock; a long strong taproot enables it to stand long periods of drought. Sow 4 to 6 lbs. per acre in drills, or 8 to 12 lbs per acre broadcast.

Now Available for Immediate Delivery.
1/6 lb.; 150/- cwt. f.o.b. Melbourne.

LAW, SOMNER Pty. Ltd.

British and Colonial Seed Merchants,

139-141 Swanston Street, MELBOURNE.

Established 1850.

Tel. Central 729.

Write for our Special Farm Circular
Post Free on request.

Farm and Garden Notes for September.

FIELD.—Spring has now arrived, and with it there will be the usual trouble with weeds, especially on carelessly prepared ground. Therefore, the cultivator and the horse and hand hoe must be kept vigorously at work to check the weed pests and save the growing crops as well as much future labour. Attend to earthing up any crop which may require it. There may possibly occur drying winds, dry weather, and even very late frosts, which have not been unknown in parts of this State even as late as September. Still, good showers may be looked for in October, and much useful work may be done during the present month which will go far to afford a fair prospect of a good return for labour. Intending sisal hemp growers may now plant out *Agave rigida*, var. *Sisana* (sisal hemp plant), in rows 6 to 8 ft. apart, according to the richness of the soil. All dry places on the farm, too rocky or too poor for any ordinary crops, may be planted with this valuable aloe. Especially should limestone country be selected for the purpose. If the soil is very poor, and the plants very small, it is better to put the latter out into a nursery of good soil, about 1 ft. apart. Next year they will be good-sized plants. Keep down tall weeds in the plantation, and do not allow couch or buffalo grass to grow about the roots. Sisal will do no good if planted on low-lying wet land, or on a pure sandy soil. It thrives best where there is plenty of lime, potash, and phosphoric acid, all of which (except potash, unobtainable under present war conditions) can be cheaply supplied if wanting in the soil. Sisal requires so little labour from planting to maturity that it can be grown to good profit despite the high cost of white labour. The price of the fibre now ranges from £50 to £60 per ton. Sow cotton—Sea Island near the coast, and Uplands generally. Sow maize, sorghum, imphee, mazzagua, Indian cane, prairie grass, Rhodes grass and paspalum, panicum, tobacco, pumpkins, and melons, including the Cassaba melon. Sugar-cane planting should be vigorously carried on. Plant sweet potatoes, yams, peanuts, arrowroot, tumeric, chicory, ginger, and canaigre, the latter a tuber yielding a valuable tanning substance. Plant out coffee.

KITCHEN GARDEN.—Now is the time when the kitchen garden will richly repay all the labour bestowed upon it, for it is the month for sowing many kinds of vegetables. If the soil is not naturally rich, make it so by a liberal application of stable manure and compost. Manure for the garden during summer should be in the liquid form for preference. Failing a sufficient supply of these, artificials may be used with good results. Dig or plough the ground deeply, and afterwards keep the surface in good tilth about the crops. Water early in the morning or late in the evening, and in the latter case, stir the soil early next day to prevent caking. Mulching with straw, leaves, or litter will be of great benefit as the season becomes hotter. It is a good thing to apply a little salt to newly dug beds. What the action of salt is, is not exactly known, but when it is applied as a top dressing it tends to check rank growth. A little is excellent for cabbages, and especially for asparagus, but too much renders the soil sterile, and causes hardpan to form. French or kidney beans may now be sown in all parts of the State. The Lima bean delights in the hottest weather. Sow the dwarf kinds in drills 3 ft. apart and 18 in. between the plants, and the climbing sorts 6 ft. each way. Sow Guada bean, providing a trellis for it to climb on later. Sow cucumbers, melons, marrows, and squash at once. If they are troubled by the red beetle, spray with Paris green or London purple. In cool districts, peas and even some beetroot may be sown. Set out egg plants in rows 4 ft. apart. Plant out tomatoes 3½ ft. each way, and train them to a single stem, either on stakes, trellis, or wire netting. Plant out rosellas. Sow mustard and cress, spinnach, lettuce, vegetable marrows, custard marrows, parsnips, carrots, chicory, eschalots, cabbage, radishes, kohl-rabi, &c. These will all prove satisfactory, provided the ground is well worked, kept clean, and that water, manure, and, where required, shade are provided.

FLOWER GARDEN.—Continue to plant bulbs as directed last month. Protect the plants as much as possible from cold westerly winds, which may still occur, notwithstanding the increasing temperature. Be careful that the bulbs do not come in contact with fresh manure. Keep a good lookout for slugs. Plant out chrysanthemums, palms, and all kinds of tropical and semi-tropical plants. If hot weather should ensue after planting, water and shade must be given. Sow dianthus, snapdragon, and coleus, seed or cuttings of the latter. Roses will now be in full bloom. Keep them free from aphids, and cut off all spent blooms. This latter work should be done in the case of all flowers. If you wish to save seeds, do not wait for the very last blooms, but allow some of the very best to go to seed. If you have any toads in the garden or bush-house, encourage them to take up their abode there. They are perfectly harmless, in spite of their ugliness, and they destroy an astonishing number of insects injurious to plants. Fill up all vacancies with herbaceous plants. Sow zinnia, gaillardia, amaranthus, cockscomb, balsam, sunflower, marigold, cosmos, summer chrysanthemum, coreopsis, portulaca, mesembryanthemum, calendula, &c.

Orchard Notes for September.

THE SOUTHERN COAST DISTRICTS.

The marketing of citrus fruits, in the later districts, of the late winter or early spring crop of pines and bananas, also of strawberries and Cape gooseberries, will continue to occupy the attention of fruitgrowers. We can only repeat the advice we have so often given in these Notes respecting the marketing of all kinds of fruit—viz., to grade the fruit evenly, pack honestly, and display it to the best advantage if you want to get good returns.

September is a very important month to the fruitgrower, owing to the fact that it is usually a dry month, and that it is essential in all cases to keep the land in a high state of tilth, so as to retain the moisture that is required by the various trees that are in blossom, thus securing a good set of fruit. Where irrigation is available, it is advisable to give the trees a good watering should the ground be dry, as this will induce a good growth and cause the fruit to set well. If an irrigation is given, it should be a thorough one, not a mere surface watering, and once the land is saturated the moisture must be retained in the soil by constant and systematic cultivation. If this is done, one good watering will usually be enough to carry the trees through in good condition to the thunderstorms that come later or even to the summer rains, if the soil is of a deep sandy loamy nature.

No weeds must be allowed in the orchard or vineyard at this time of the year, as they are robbing the trees and plants of both the water and plant food that are so essential to them at this period of their growth.

There is not much to be done in the way of fighting scale insects during the month, as they are more effectually dealt with later on; but where young trees are showing signs of distress, owing to the presence of scale insects, they should be treated, the gas method being the most efficacious.

Beetles and other leaf-eating insects often make their appearance during the month. The best remedy is to spray the trees or plants with one or other of the arsenical washes that are recommended by me in this Journal. The vineyard will require considerable attention. Not only must it be kept well worked, but any vines that are subject to the attack of black spot must be sprayed from time to time with bordeaux mixture. Disbudding must be carefully carried on, as this work is equally as important as the winter pruning, as it is the best means of controlling the future shape of the vine. A very common fault with vines grown in the coast districts is that the buds often remain dormant, only the terminal bud and possibly one other starting into growth, thus leaving a long bare space on the main rods, which is undesirable. When this takes place, pinch back those shoots that have started, and

which are taking the whole of the sap, and force the sap into the dormant buds, thus starting them into growth. This will result in an even growth of wood all over the vine—not a huge cane in one part and either a stunted growth or dormant buds on the rest.

Every care should be taken during the month to prevent the fruit fly from getting an early start. All infested oranges, loquats, kumquats, or other fruits should be gathered and destroyed, as the keeping in check of the early spring crop of flies, when there are only comparatively few to deal with, will materially lessen the subsequent crops. Land that is to be planted to pines or bananas should be got ready now, though the planting need not be done till October, November, or even later. Prepare the land thoroughly; don't scratch the surface to the depth of a few inches, but plough as deeply as you have good surface soil, and break up the subsoil as deeply as you can possibly get power to do it. You will find that the extra money expended will be a profitable investment, as it will pay every time.

THE TROPICAL COAST DISTRICTS.

September is usually a very dry month, and fruit trees of all kinds suffer in consequence. The spring crop of citrus fruits should be harvested by the end of the month, as, if allowed to hang later, there is a great risk of loss by fly. The fruit should be well sweated, and, if carefully selected, well-graded, and well packed, it should carry well to, and fetch high prices in, the Southern States, as there are no oranges or mandarins grown in Australia that can excel the flavour of the best of the Bowen, Cardwell, Cairns, Port Douglas, or Cooktown fruit.

As soon as the fruit is gathered, the trees should be pruned and sprayed with the lime and sulphur wash, as this wash is not only a good insecticide, but it will keep down the growth of all lichens, mosses, &c., to which the trees are very subject.

Every care should be taken to keep down the crop of fruit-fly during the month. All infested fruit should be gathered and destroyed, particularly that in or adjacent to banana plantations. Watch the banana gardens carefully, and keep well cultivated. New land should be got ready for planting, and where land is ready planting can take place.

Papaws and granadillas are in good condition now, and, if carefully gathered and well packed in cases only holding one layer of fruit, they should carry well to the Southern markets if sent in the cool chamber.

THE SOUTHERN AND CENTRAL TABLELANDS.

Prune grape vines at Stanthorpe in the early part of the month, leaving the pruning as late as possible, as the object is to keep the vines back in order to escape damage from late spring frosts. All vines subject to the attack of black spot should be treated with the winter dressing when the buds are swelling; this treatment to be followed by spraying with Bordeaux mixture later on.

Where fruit trees have not received their winter spraying, they should be treated at once before they come out into flower or young growth. Where the orchard or vineyard has not been ploughed, do so, taking care to work the land down fine as soon as it is ploughed, so as to keep the moisture in the soil, as the spring is always the trying time for fruit trees.

Look out for fruit-fly in the late oranges and loquats in the Toowoomba district. Keep the orchards and vineyards well cultivated; disbud the vines when sufficiently advanced. Spray for codlin moth.

In the Central tablelands irrigate vines and fruit trees, and follow the irrigation with deep, constant, and systematic cultivation. Keep down all weed growth, and fight the red scale on citrus trees with cyanide. The objective of the fruitgrowers throughout Queensland during September and the following months is, "How best to keep the moisture in the soil that is required by the trees, vines, plants, and vegetables"; and this objective can only be obtained by irrigation where same is available, or by deep, systematic, and constant cultivation where there is no water available for irrigation.

ASTRONOMICAL DATA FOR QUEENSLAND.

TIMES COMPUTED BY D. EGLINTON, F.R.A.S.

TIMES OF SUNRISE AND SUNSET.
AT BRISBANE.

1920.	SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		PHASES OF THE MOON, ECLIPSES, &c. (The times stated are for Queensland, New South Wales, and Victoria). H. M. 6 Sept. ☾ Last Quarter 5 5 a.m. 12 „ ☉ New Moon 10 52 p.m. 20 „ ☾ First Quarter 2 55 p.m. 28 „ ○ Full Moon 11 57 a.m. Perigee on 9th at 8 12 a.m. Apogee on 21st at 8 42 a.m. 5 Oct. ☾ Last Quarter 10 54 a.m. 12 „ ☉ New Moon 10 50 a.m. 20 „ ☾ First Quarter 10 30 a.m. 28 „ ○ Full Moon 12 9 a.m. Perigee on 4th at 7 54 p.m. and 31st at 12 26 a.m. Apogee on 19th at 4 42 a.m. A Total Eclipse of the Moon will occur on the night of the 27th, commencing about 11 30. An hour earlier it will be entering the dark shadow of the earth. 3 Nov. ☾ Last Quarter 5 35 p.m. 11 „ ☉ New Moon 2 5 a.m. 19 „ ☾ First Quarter 6 13 a.m. 26 „ ○ Full Moon 11 42 a.m. Apogee on 16th at 12 18 a.m. Perigee on 27th at midnight. The Moon will cause a partial eclipse of the Sun during the night of the 10th, visible only on the other side of the world, including Great Britain and Ireland. 3 Dec. ☾ Last Quarter 2 29 a.m. 10 „ ☉ New Moon 8 4 p.m. 19 „ ☾ First Quarter 12 40 a.m. 25 „ ○ Full Moon 10 39 p.m. Apogee on 13th at 3 30 p.m. Perigee on 26th at 10 24 a.m.
Date.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.	
1	6.1	5.35	5.29	5.47	4.59	6.5	4.46	6.28	
2	6.0	5.35	5.28	5.48	4.58	6.6	4.46	6.29	
3	5.59	5.36	5.27	5.49	4.57	6.6	4.46	6.30	
4	5.58	5.36	5.26	5.49	4.57	6.7	4.46	6.31	
5	5.57	5.37	5.24	5.50	4.56	6.8	4.46	6.32	
6	5.56	5.37	5.23	5.50	4.55	6.9	4.46	6.33	
7	5.55	5.37	5.22	5.50	4.55	6.9	4.46	6.33	
8	5.54	5.37	5.21	5.51	4.54	6.10	4.47	6.34	
9	5.53	5.38	5.20	5.51	4.53	6.10	4.47	6.34	
10	5.52	5.38	5.19	5.51	4.52	6.11	4.47	6.35	
11	5.50	5.38	5.17	5.52	4.52	6.12	4.47	6.35	
12	5.49	5.39	5.16	5.52	4.51	6.13	4.48	6.36	
13	5.48	5.39	5.15	5.53	4.51	6.14	4.48	6.36	
14	5.47	5.40	5.14	5.54	4.50	6.15	4.48	6.37	
15	5.46	5.40	5.13	5.55	4.50	6.16	4.49	6.37	
16	5.45	5.41	5.12	5.55	4.49	6.17	4.49	6.38	
17	5.44	5.41	5.11	5.56	4.49	6.18	4.49	6.38	
18	5.43	5.42	5.10	5.56	4.48	6.18	4.50	6.39	
19	5.42	5.42	5.9	5.57	4.48	6.19	4.50	6.39	
20	5.41	5.43	5.8	5.58	4.48	6.20	4.50	6.40	
21	5.40	5.43	5.7	5.59	4.48	6.21	4.51	6.40	
22	5.39	5.43	5.6	5.59	4.48	6.21	4.51	6.41	
23	5.38	5.44	5.5	6.0	4.48	6.22	4.52	6.41	
24	5.37	5.44	5.4	6.0	4.47	6.22	4.52	6.42	
25	5.36	5.44	5.4	6.1	4.47	6.23	4.53	6.43	
26	5.34	5.45	5.3	6.1	4.47	6.24	4.53	6.43	
27	5.33	5.45	5.2	6.2	4.47	6.24	4.54	6.44	
28	5.32	5.45	5.1	6.2	4.47	6.25	4.54	6.44	
29	5.31	5.46	5.0	6.3	4.47	6.26	4.55	6.45	
30	5.30	5.46	5.0	6.3	4.47	6.27	4.56	6.45	
31	...	...	4.59	6.4	...	...	4.57	6.45	

For places west of Brisbane, but nearly on the same parallel of latitude—27½ degrees S.—add 4 minutes for each degree of longitude. For example, at Toowoomba the sun would rise about 4 minutes later than at Brisbane if it were not for its higher elevation, and at Oontoo (longitude 141 degrees E.) about 48 minutes later.

At St. George, Cunnamulla, and Thargomindah the times of sunrise and sunset will be about 18 m., 30 m., and 38 minutes respectively, later than at Brisbane.

At Roma the times of sunrise and sunset may be roughly arrived at by adding 16 minutes to those given for Brisbane, but an allowance of 3 or 4 minutes more is sometimes necessary.

The moonlight nights for each month can best be ascertained by noticing the dates when the moon will be in the first quarter and when full. In the latter case the moon will rise somewhat about the time the sun sets, and the moonlight then extends all through the night; when at the first quarter the moon rises somewhere about six hours before the sun sets, and it is moonlight only till about midnight. After full moon it will be later each evening before it rises, and when in the last quarter it will not generally rise till after midnight.

It must be remembered that the times referred to are only roughly approximate, as the relative positions of the sun and moon vary considerably.

[All the particulars on this page were computed for this Journal, and should not be reproduced without acknowledgment.]

LET BRADSHAW'S INTO YOUR HOME !

IT WILL MEAN EFFICIENCY.

BRADSHAW'S 26:6:26 symbolises proficiency in Shorthand, with ease, in a few weeks—5 easy lessons and Instructions for Speed practice. One boy completed his Theory and was writing slow speed at end of 5½ hours. Ask for Pamphlet P30.

TYPEWRITING—Learn to operate a typewriter. To anyone entering business it is as necessary to know the use of a typewriter as it is to be able to handle a pen. You will have the use of a machine in your home. Shorthand writers should be able to transcribe their notes on the typewriter.

HANDWRITING—So practically is this subject taught that "once bad penmen" write us of their appreciation, and are astonished at the short time it takes to develop a finished style of business handwriting.

ADVERTISING—There is no profession quite as fascinating and inspirational as Advertising. To ladies and gentlemen the Advertising field is broad in its scope. The ability to write good advertisements may be acquired through Bradshaw's.

Salesmanship, Tailoring, Cutting, Designing, Timber Measurement, Mechanical Drawing, Book-keeping, Business Correspondence, and many other subjects can be efficiently **LEARNED by Post.**

There are big opportunities awaiting people who are big enough to see them. A Bradshaw training will give you the knowledge and the vision that meets opportunity halfway.

You can be taught by specialised postal tuition and be made a business success in your leisure time and in your own home.

Write us particulars of your case. We will advise you as to a career.

GET A LETTER AWAY TO-DAY.

BRADSHAW'S BUSINESS
COLLEGE
PTY., LTD.,

244-50 FLINDERS STREET, MELBOURNE, VICTORIA.

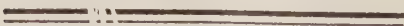
RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF JUNE IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALLS DURING JUNE, 1920 AND 1919, FOR COMPARISON.

Divisions and Stations.	AVERAGE RAINFALL.		TOTAL RAINFALL.		Divisions and Stations.	AVERAGE RAINFALL.		TOTAL RAINFALL.	
	June.	No. of Years' Records.	June, 1920.	June, 1919.		June.	No. of Years' Records.	June, 1920.	June, 1919.
<i>North Coast.</i>					<i>South Coast—continued:</i>				
	In.		In.	In.		In.		In.	In.
Atherton	1·59	19	0·32	1·28	Nambour	3·18	24	3·94	1·41
Cairns	2·75	38	1·75	2·21	Nanango	1·88	38	3·12	0·70
Cardwell	2·03	48	3·13	1·30	Rockhampton ...	1·96	33	0·59	0·87
Cooktown	2·02	44	1·19	1·47	Woodford	2·50	33	2·51	1·00
Herberton	0·96	33	0·94	0·81					
Ingham	2·31	28	3·94	0·28					
Innisfail	6·59	39	4·22	8·23					
Mossman	2·14	12	...	1·86					
Townsville	1·29	49	1·02	0·34					
<i>Central Coast.</i>					<i>Darling Downs.</i>				
					Dalby	1·59	50	2·12	0·07
Ayr	1·31	33	1·91	0·79	Emu Vale	1·29	24	1·61	0·02
Bowen	1·63	49	1·24	2·69	Jimbour	1·54	32	1·80	0·10
Charters Towers ...	1·37	38	0·75	0·20	Miles	1·85	35	1·93	Nil
Mackay	2·70	49	3·07	1·61	Stanthorpe	1·74	47	4·61	0·30
Proserpine	3·65	17	3·19	2·84	Toowoomba	2·27	48	2·72	0·79
St. Lawrence	2·45	49	2·88	0·83	Warwick	1·56	33	2·28	0·19
<i>South Coast.</i>					<i>Maranoa.</i>				
					Roma	1·63	46	2·26	0·70
Biggenden	1·74	21	2·27	0·04					
Bundaberg	2·67	37	2·67	0·13					
Brisbane	2·57	69	3·24	0·78					
Childers	2·10	25	2·97	0·07					
Crohamhurst	4·13	25	3·83	2·40					
Esk	1·92	33	2·35	0·86					
Gayndah	1·77	49	1·96	0·08					
Gympie	2·43	50	3·12	0·81					
Glasshouse M'tains	3·46	12	4·73	1·16					
Kilkivan	1·90	41	2·19	0·56					
Maryborough	2·78	49	3·44	0·67					
					<i>State Farms, &c.</i>				
					Bungeworgorai ...	1·08	6	3·19	0·49
					Gatton College ...	1·52	21	2·18	0·40
					Gindie	1·44	21	1·40	0·09
					Hermitage	1·72	14	2·15	0·11
					Kairi	0·80	6	0·72	1·27
					Sugar Experiment				
					Station, Mackay	2·20	23	3·40	1·56
					Warren	1·13	6	1·23	0·15

NOTE.—The averages have been compiled from official data during the periods indicated; but the totals for June this year, and for the same period of 1919, having been compiled from telegraphic reports are subject to revision.

GEORGE G. BOND, State Meteorologist.



Queensland.

Department of Agriculture and Stock.

Volume XIV.



SEPTEMBER, 1920.

OCT 20 1920

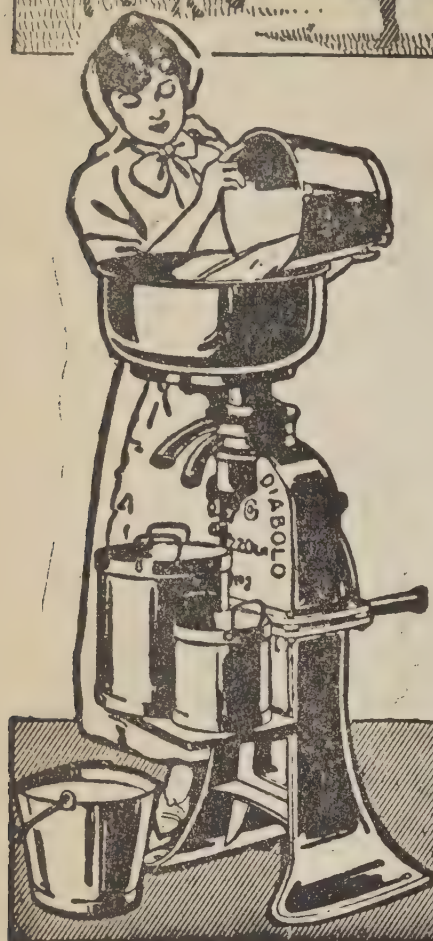
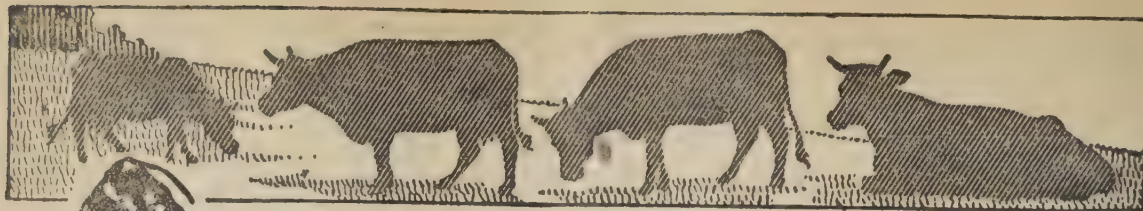
U.S. D.

Queensland Agricultural Journal.



REGISTERED AT THE GENERAL POST OFFICE, BRISBANE,
FOR TRANSMISSION BY POST AS A NEWSPAPER.

Edited by
A. J. BOYD, F.R.G.S.Q.



Let your Children do the Skimming with a "Diabolo" Separator

They will enjoy this task—the machine runs so easily and smoothly. They can take the Diabolo Separator apart and clean it too—there are no clumsy, heavy parts to handle. Where there's a Diabolo Separator—skimming time is play time.

DIABOLO
CREAM SEPARATOR CO.
138-140 CREEK ST BRISBANE

SEEDS !

THERE is satisfaction in sowing seeds that will give abundant crops. This is what you want, is it not? Then sow **TAYLOR'S SEEDS**. Success in Farming is influenced by many factors such as weather, soil, method of cultivation, etc., but **PURE SEED** is the first rung on the ladder of success on the farm.

BIGGER CORN CROPS

are assured if you plant **TAYLOR'S SEED MAIZE**. Our New Season's stock of Seed Maize has just arrived, and includes all the leading varieties. Can we quote you? All samples are of good germinating quality.

FODDER CROP SEEDS.

For present planting we have **Imphee, Panicum, Amber Cane, Sorghum, Japanese Millet, Rhodes Grass, Paspalum, Couch Grass**, and last, but by no means least,

SUDAN GRASS SEED.

If you live in a dry district you really cannot afford to be without **Sudan**, as its drought-resisting qualities are well proved. It is also a prolific yielder, and a nutritious food for all kinds of stock.

We also have good stocks of **VEGETABLE AND FLOWER SEEDS** of all kinds—for the farm, flower garden, and vegetable garden. Sold in packets, from 3d. each upwards, also in bulk.

CHAS. TAYLOR & CO.,
"The Leading Seedsmen,"

—124-130 ROMA STREET, BRISBANE.—

VOL. XIV., PART 3.]

[SEPTEMBER, 1920

Registered at the General Post Office for Transmission by Post as a Newspaper.]



THE
QUEENSLAND AGRICULTURAL JOURNAL,

ISSUED BY DIRECTION OF

THE HON. THE SECRETARY FOR AGRICULTURE.

EDITED BY A. J. BOYD F.R.G.S.Q.

VOL. XIV. PART 3.

SEPTEMBER.

By Authority:

ANTHONY JAMES CUMMING, GOVERNMENT PRINTER, BRISBANE.

1920

We are Bag Specialists

For Farmers For Farmers For Farmers

Bags for Wheat, Maize, Chaff, Peas, Beans, etc.
Any sort or kind. New or Second Hand.

For Storekeepers, Meat Exporters, Flour
———**Millers, Bacon Curers, etc.**———

All kinds of HESSIAN and CALICO BAGS
———Printed to your own design.———

For Packing, Signwriting, Plastering, etc.
HESSIAN & CALICO all widths & grades.

Joyce Bros. (Q.) Limited,
Stanley Street, South Brisbane.

COWPEAS

The weather is now warm enough to sow cowpeas. As a fodder they stand high. They yield a large amount of forage which is rich in proportion. They are useful in any stage—green, hay, chaff or ensilage; and the land is better after they are taken off than when they were sown. As a green manure cowpeas are very valuable. They are better known in this direction than any other. We can supply you from good stocks. *Price on application.*

H. A. PETERSEN LTD.

Seedsman and Nurseryman

George St., and 244 Queen St.
BRISBANE

CONTENTS.

	PAGE.		PAGE.
AGRICULTURE—		TANNING HIDES	145
Some Feeding Experiments with		BOTANY—	
Dried Blood (L. F. Newman) ...	89	The White Cedar (<i>Melia azedarach</i> ,	
What Silage is and How to Feed It		var. <i>australasica</i>): A Plant	
(Cuthbert Potts)	93	Poisonous to Pigs (C. T. White,	
Sunflower Silage	103	F.L.S.)	145
Irrigation of the Woongarra Sugar		ENTOMOLOGY—	
District, Bundaberg, No. 2 ...	103	Cane Grub Investigation	148
Exhibition Notes, 1920—		GENERAL NOTES—	
The National Association's		A New Fruit Evaporator	153
Exhibition, July, 1920 ...	107	A British Cotton Substitute ...	153
Juvenile Corn-growing Competition	125	War on Fruit-eating Birds and Rats	
Grain for Sale	125	in the Cane Field	153
DO HORNS TELL AGE?	126	Societies, Show Dates, &c. ...	154
PASTORAL—		A Watch as a Compass	154
Breeders of Purebred Stock—Beef		Exhibition Sales	154
and Dairy Cattle	127	ANSWERS TO CORRESPONDENTS—	
DAIRYING—		Construction of a Sundial	155
Dutch or Friesian Cattle	129	How to Get Rid of Warts on Cattle	155
THE HORSE—		Contents of a Silage Stack	155
Prevention of Corns in Horses ...	130	Roup in Fowls	155
POULTRY—		THE MARKETS—	
Report on Egg-laying Competition,		Prices of Farm Produce in the	
Queensland Agricultural College,		Brisbane Markets for August, 1920	156
July, 1920	131	Vegetables—Turbot Street Markets	156
Final Report of the Sixteenth Egg-		Southern Fruit Markets	157
laying Competition, Queensland		Prices of Fruit—Turbot Street	
Agricultural College	133	Markets	157
The Chinese Langshan Fowl (D.		Top Prices, Enoggera Yards, July,	
Wallace)	136	1920	157
HORTICULTURE—		FARM AND GARDEN NOTES FOR OCTOBER ...	159
Some Phases in the Cultivation of		ORCHARD NOTES FOR OCTOBER	159
Sweet Peas (F. Phillips)	138	RAINFALL IN THE AGRICULTURAL DISTRICTS	161
A PESTILENT WEED	141	ASTRONOMICAL DATA	162
TROPICAL INDUSTRIES—		GLYCERINE FROM SUGAR	164
Sugar-cane Planting in the Northern		TO PICKLE ONIONS	164
District	142	PICKLED RED CABBAGE	164
Sugar-cane in the Northern District	142	DEPARTMENTAL ANNOUNCEMENTS ...	XVII.
The Sisal Fibre Industry	144		
Variation in Coconuts	144		



You paint a house to protect as well as to beautify it—be sure to use a paint that will withstand the elements. A guarantee as to lasting quality goes with every can of

Berger's
Paint  (Prepared)

James Campbell & Sons Ltd.
Creek Street, Brisbane,
Distributors for Queensland.

Sold by local agents in most towns

OVERCOAT WEATHER

—and the House of PIKE BROTHERS is splendidly ready to supply OVERCOATS that are full of good, new style and superb quality.=====

Dark Grey Tweed overcoats, Raglan Sleeves, fashionably made with loose belt right round.

Price, **80/-**

Same quality and shape, but without belt.

Price, **77/6**

Better qualities, and superb qualities at that.

Price, **5, 6, & 7** guineas.



—and now for these very warm



Coat Sweaters

All-wool coat sweaters, Brown and Grey shades, showing "V" front or button to throat with collar. Sizes, 34 to 44. Exceptional Values.

22/6 to 50/-

Carriage is Paid.

PIKE
BRISBANE

BROTHERS
LIMITED

TOWNSVILLE
TOOWOOMBA

QUEENSLAND AGRICULTURAL JOURNAL

VOL. XIV.

SEPTEMBER, 1920.

PART 3

Agriculture.

SOME FEEDING EXPERIMENTS WITH DRIED BLOOD.

L. F. NEWMAN, Dip. Agric. (Camb.), School of Agriculture, Cambridge University.

Very considerable quantities of blood are available daily in the abattoirs and slaughterhouses of Great Britain. The blood is collected in pans or allowed to drain away into a collecting gully. In some of the smaller slaughterhouses the blood is either wasted or used for manure, as only a small amount is obtained daily. In the North of England some of the public abattoirs collect blood for the production of serum and for the manufacture of "black puddings," &c.

The quantity of blood potentially available for these purposes may be estimated from the fact that about 30 lb. are obtained when a bullock is slaughtered, and during the years before the war about 3,080,000,000 lb. of meat per year was home-killed.

In recent years several firms have placed dried blood on the market as an animal food, and considerable claims have been made as to the value of this preparation when used as part of a fattening animal's rations. A certain amount of dried blood is thus available as food for animals, and during the war the difficulty of obtaining nitrogenous foods, especially for pigs, but also for other animals, led to a number of inquiries as to its value and safety as a nitrogen-supplying form of diet. It was, therefore, considered desirable by the Food Investigation Board to institute a series of trials in which blood was the main source of nitrogen, with the object of obtaining data as to its value. The two ordinary grades of blood obtainable are (1) blood dried immediately after collection, and hence free from objectionable odours or decomposition-products; and (2) blood collected in small lots and stored before drying. The second grade is only suitable for manure, while the first is on sale as an animal food. As fresh blood can always be obtained at the larger abattoirs in quantity and dried down immediately, a constant supply is obtainable, limited only by the output from the drying plants.

Dried blood, when properly prepared, is a dry powder with little smell, a pleasant meaty taste, and a salt flavour, and is quite different from the fresh clots of blood which are sometimes fed to pigs together with such offal as the "manifolds" or third stomachs of sheep and oxen, where proximity to a slaughterhouse allows purchase in a fresh condition.

A series of experiments was, therefore, designed to test the value of dried blood as an addition to ordinary carbohydrate diets, and also to ascertain how far it could be used to supplement the deficiency of a single foodstuff unsuitable by itself, either owing to lack of nitrogen or to absence of accessory food factors.

FEEDING TRIALS.

A number of trials have been carried out by different investigators on dried blood, and the results have indicated that it possesses considerable food value when added to a mixed diet, but it was decided to restrict the experiment to the effect of blood as an addition to a carbohydrate diet. For this purpose two series of experiments were arranged:

- (1) Blood as an addition to maize meal.
- (2) Blood as an addition to wheat offals.

Some experiments on the addition of casein to maize meal are recorded in "Amer. Jour. Bio. Chem." (Vol. xxix., Part 3), maize + casein + salt mixture and maize + germ being tried against maize + salt mixture only. In these trials three animals in each lot were fed for a period of 180 days, with the following results:—

Maize + casein + salt mixture	..	..	average gain	179	lb.
Maize + germ	..	..	" "	119	"
Maize + salt mixture only	..	..	" "	12.3	"

These results indicate an extraordinarily low value for maize as a single food, and it was thought that a basal diet of maize would allow any effects of added blood to be clearly seen. It has also been stated that the addition of blood to an ordinary diet not only caused a greater increase in the live weight of blood-fed pigs than would be expected from its food value, but also that the proportion of the carcass to live weight was greater than that in animals fed in the ordinary way. It was therefore decided to follow the pigs through the slaughterhouse and to ascertain the dead-weight proportion of the animals as well as the gross increase during the course of the experiment.

Twenty-eight pigs were selected and divided into four lots of seven pigs each, each lot being arranged to average, as nearly as possible, the same total live weight. Each included two "large white," one "large black," and four cross-bred pigs, so that a fair average on such animals as are used in ordinary farming practice could be obtained.

EXPERIMENT I.

The pens of seven pigs were fed as follows:—

- Lot I. received wheat offals only.
- " II. " maize meal only.
- " III. " wheat offals and dried blood.
- " IV. " maize meal and dried blood.

In addition, each pig received $\frac{1}{2}$ oz. bone meal daily.

The amount of blood fed to each pig in Lots III. and IV. was 2 oz. per day to begin with, rising gradually to 6 oz. per pig per day, an average of 4 oz. per day; an extra 5 lb. per pen was allowed so as to bring the total to 1.25 cwt. in all for both lots of blood-fed pigs. It took two or three days before the pigs tolerated the blood, but after they became used to the mixture they took it willingly, and apparently liked the taste.

The blood used was a mixture of equal parts of blood supplied by two different firms. The two samples were rather different in composition, as shown by the following analyses:—

							Percentages.		
							A	B	
Water	..	..	..	..	..	..	7.27	..	8.30
Ash	..	..	..	..	..	..	8.60	..	3.63
Protein (N \times 6.25)	..	..	..	..	..	..	50.00	..	82.78

It will be seen that the samples varied considerably in composition, as A was whole blood while B was partly clot from serum production. Both, however, were well dried, free from smell, and finely divided.

Each lot of pigs received altogether 1.25 cwt. of blood during the eleven weeks of the experiment, and the corresponding pen had a weight of maize and offal added to make up an equal total weight of ration. During the last fortnight but one the pigs in Lot IV. received 28 lb. more maize than those in Lot II. and 112 lb. more during the last fortnight, as it was obvious that they were needing an extra

ration. In the other cases, however, the total weights of food given were similar. Lot II. occasionally refused food, and 37 lb. of maize in all were weighed back and carried on to the next meal, when an equal amount was deducted from the weight of food fed at that meal.

During the experiment the ration was fixed by the maximum which could be fed to the control pens. In both diets the blood-fed pigs were much livelier and more hungry than the controls, and had the former been on an *ad lib.* diet they would have taken much more food than the controls.

It was originally hoped to keep the nitrogen ratio constant by substituting pure starch for some of the maize and offal in the blood-fed lots, but this was found to be impossible in practice, owing to the difficulty in obtaining starch in sufficient quantity, and it is not in accordance with farming practice to use pure nitrogen-free starches for farm animals. The object of the experiment was to demonstrate the use or value of blood as an addition to ordinary agricultural foods.

	Maize Meal.						Wheat Offal.		
Water	12.81	..	12.62
Ash	1.12	..	4.53
Protein (= N \times 6.25)	9.37	..	14.30
Fibre	0.60	..	9.60
Fats	3.26	..	4.16
Carbohydrates	72.84	..	55.99

These were supplied through the ordinary channels; the maize was of good quality, well-ground and in good condition, but the offals were of somewhat inferior quality, especially in comparison with pre-war standards. Different bags varied somewhat in appearance, so that three were kept in use at a time and the ration made up by mixing the contents to ensure as far as possible an even quality from day to day.

The pigs were weighed at weekly intervals, and after eleven weeks feeding gave the following total results:—

Lot.	Weight at start.		Weight at finish.		Gain on Loss (—).		Value of Gain on Loss (—).		
	lb.		lb.		lb.		£	s.	d.
I.	381 $\frac{3}{4}$	..	600	..	218 $\frac{1}{4}$	..	11	7 0
II.	409 $\frac{1}{4}$	..	406	..	—3 $\frac{1}{4}$	..	—0	3 0
III.	402 $\frac{1}{4}$	..	686	..	283 $\frac{3}{4}$	..	14	18 0
IV.	415 $\frac{1}{4}$	..	623	..	207 $\frac{3}{4}$	..	10	18 0

The pigs in Lot II. showed very little appetite, and after a week or two took their ration of plain maize meal only with reluctance and when pressed by hunger. As will be seen from the table, they put on no weight and rather fell off in condition, so that it was not considered advisable to continue the diet. Lots I. and III. were continued on their diet until they weighed about 1 cwt. (porker), so that it would be ascertained whether the use of blood gave a greater proportion of carcass to live weight than wheat offals only.

Lot. No.	Live weight.		Carcass weight.		Plucks.		Entrails.	
	lb.		lb.		lb.		lb.	
I.—(i.)	120	..	80	..	4	..	17
I.—(ii.)	136 $\frac{1}{2}$	..	88	..	6	..	14
I.—(iii.)	120 $\frac{1}{2}$	..	81	..	5	..	14
I.—(iv.)	120	..	84	..	4	..	12
III.—(i.)	131	..	85	..	6	..	18
III.—(ii.)	138	..	93	..	6	..	15 $\frac{1}{2}$
III.—(iii.)	115	..	78	..	4	..	14
III.—(iv.)	108	..	71	..	4	..	16
III.—(vii.)	119	..	94	..	5	..	13
IV.—(i.)	125 $\frac{1}{2}$	..	88	..	4	..	13
IV.—(v.)	121	..	83	..	4	..	11
IV.—(vi.)	124	..	79	..	5	..	14

EXPERIMENT II.

It was then thought that the addition of a small amount of fresh vegetable food, such as is often given to pigs on farms, might possibly affect the general metabolism of the animals. The pigs in Lot II. were divided into two pens, and one pen received a single kohl-rabi plant per pig per day, in addition to the diet, for another period of four weeks. The results are shown in the following table. The same procedure was adopted with the pigs in Lots I., III., and IV., where two of the pigs not intended for slaughter were given kohl-rabi and tried against two on a continuation of the experimental diet.

				Weight at start.		Weight at finish.		Gain or loss (—).
				lb.		lb.		lb.
Lot I.—								
A.	no kohl-rabi	..	..	..	153	..	199	.. 46
B.	kohl-rabi	..	..	..	156½	..	212½	.. 56
Lot II.—								
A.	no kohl-rabi	..	..	..	173½	..	160	.. 13½
B.	kohl-rabi	..	..	..	176½	..	191	.. 14½
Lot III.—								
A.	no kohl-rabi	..	..	..	185	..	240	.. 55
B.	kohl-rabi	..	..	..	186½	..	238	.. 51½
Lot IV.—								
A.	no kohl-rabi	..	..	..	134½	..	105½	.. 1
B.	kohl-rabi	..	..	..	115	..	153½	.. 35

The experiment was then discontinued. The kohl-fed pigs in Lot II., receiving maize meal, improved considerably in health, became lively, and took their food with much greater relish. The control pigs on maize meal alone still refused their food and made a slight loss in weight.

In Lot IV. the pigs receiving no kohl-rabi did not increase in weight, but were quite lively and in fair general condition. The seventh pig in Lot II. was taken out of the second part of the experiment as he had injured his leg against the feeding-trough. He was placed by himself and given an *ad lib.* ration of fresh mangolds in addition to maize. In three weeks he had doubled his weight from 35½ lb. to 84 lb. During the period of feeding with kohl-rabi the maize-fed pigs were given an *ad lib.* diet, but they did not take more than they had done during the course of the first experiment.

CONCLUSIONS.

The results obtained indicate that the addition of blood to an ordinary farm ration of wheat offals may cause a very considerable gain in weight compared with the results obtained from a farm diet of offals only, while the addition of blood to plain maize meal may give an increase equal to the results obtained from feeding offals only. The results obtained on maize meal alone compare exactly with those obtained by the American observers who undertook the experimental work of feeding maize to pigs as a comparison with maize + casein.

The addition of a small quantity of fresh vegetables to the diet showed a very considerable gain as against an ordinary ration, but their use appeared to be unnecessary when a full diet of wheat offal plus blood was fed. It is, however, recognised that this part of the experiment is tentative only and requires a further trial with at least seven pigs in each lot before any definite conclusions can be arrived at.

The results are recorded, as the pigs were in such a suitable condition (*i.e.*, used to the diet) after eleven weeks of experiment as to justify the trial even on two or three animals.

The cost of dried blood is fairly high, but it must be remembered that only a few oz. should be fed daily, or an excess of nitrogen in the diet would result, and this is undesirable. In these trials the total cost of the blood was as follows:—

1.25 cwt. blood per *pen* at 18s. 6d. per cwt. = 23s. 1d. per *pen* for Expt. I.

20 lb. blood per *pig* at 18s. 6d. per cwt. = 3s 4d. per *pig* for Expt. I.

The thanks of the writer are due to the Food Investigation Board, who provided the costs of the experiment, and to Professor T. B. Wood and Professor Hopkins of the Animal Nutrition Institute, Cambridge University, for permission to use their laboratories and Nutrition Station and also for much assistance and advice.

—“Journal of the Ministry of Agriculture,” London, June, 1920.

WHAT SILAGE IS AND HOW TO FEED IT.

BY CUTHBERT POTTS, Principal of the Queensland Agricultural College.

INTRODUCTION.

If we are not to forget the lessons of the recent drought, we are forced to recognise fodder conservation as a matter of prime importance.

Fodder conservation is necessary if we are to place our live-stock industry on a sound basis, and if we are to prevent those periodic set-backs caused by droughts—set-backs which adversely affect, not only the stockman, but also the whole of our people.

We hear much talk of water conservation for irrigation purposes. Certainly, why not the storage of our rainfall in good seasons or in the rainy part of the year for use in dry seasons or in the dry part of the year? But we must remember that the sites for such water conservation are not numerous and the area that may be served is comparatively restricted.

But if the conservation of water is advisable, how much more important is it to aim at fodder conservation? In good seasons, crops and natural grasses and herbage are produced in abundance and over a wide and extended range of country. Fodder conservation, unlike water conservation, is not restricted to selected sites and localised areas. It can be practised throughout the length and breadth of the land. Fodder conservation may not be so spectacular as water conservation and irrigation, but it undoubtedly has greater possibilities with respect to our live-stock industry. If this is so, one might ask why fodder conservation is not advocated more persistently and practised more systematically. Is it due to inadequate financial support, or through lack of initiative, or because of ignorance—probably a combination of the three, with finance as the chief cause.

WHAT SILAGE IS.

There are several reasons why silage is of special importance with reference to this matter of fodder conservation.

First.—Conservation in the form of silage is by far the cheapest method. The silage is an excellent feed for beef stock and sheep, but because silage is a succulent feed it is almost a necessity for it to form part of the ration for dairy stock. With discretion, silage can be fed to horses.

Second.—Any green plants can be converted into silage. Naturally some crops are better than others, while for the best results each crop or plant should be cut at a definite stage in its growth. Of all the crops, maize cut when the seed is just glazed over is undoubtedly the best. Then follows the sorghums cut when the seed has just set. Both of these are heavy croppers and give a large yield per acre. Maize and the sweet sorghums give the best fermentation in the silo. Other crops that might be mentioned are sudan grass, panicum and millets—summer crops which yield well but which do not make as sweet a silage as maize and the saccharine sorghums. But any green stuff can be made into silage, not forgetting our native grasses.

Some crops, such as wheat, oats, and barley, are best converted into hay, but can be converted into silage. The same applies to leguminous crops, such as lucerne, cow-peas, &c.

Again, in the process of making silage poisonous elements in the plants are destroyed. Thus there is no danger of sorghum poisoning



PLATE 5.—H.R.II. THE PRINCE OF WALES IN THE SHOW RING, OPENING DAY CATTLE PARADE—NATIONAL ASSOCIATION EXHIBITION, 1920.



PLATE 6:—CENTRAL FEATURE, AGRICULTURE AND FRUITS, DEPARTMENTAL COURT —NATIONAL ASSOCIATION EXHIBITION, 1920.

once the crop has been ensilaged. Similarly, immature or second growth cornstalks lose all harmful effects in the silo, while hard spines are so softened as to destroy their irritating effects.

Third.—Silage is a wet feed. It retains the succulence of the fresh green stuff, and when used it imparts this very important quality to the feed. This cannot be emphasised too greatly, especially for dairy stock. If we are forced to feed, with dry feeds only available, then, irrespective of any quality the feeds may contain, the fact that they lack succulence frequently results in losses due to stomach derangements.

Fourth.—When properly made, silage will keep for years. After the first few months it suffers no appreciable loss or deterioration. It is not attacked by mice or other vermin and there is no danger of loss by fire, as silage won't burn.

Fifth.—Thus silage retains all the advantages of succulent green fodder. The crops can be grown at any time the season is favourable. The whole of the crop is harvested and stored, to be drawn on when required. In brief, it makes a cheap green feed available quite independently of weather conditions.

The above short description of what silage is gives good and sufficient reasons why silage should be conserved. Instructions as to how to conserve it are contained in a pamphlet published by the Department of Agriculture and Stock, Brisbane. But there remains for us the other side of the problem—how to use or feed silage.

HOW TO FEED SILAGE.

Hand feeding is not cheap feeding. Not only is there the cost of the feed to be taken into consideration, but there is also the extra labour involved.

Careless and inaccurate feeding will almost certainly result in a big loss, but careful and accurate feeding may easily yield a profit; in any case it will minimise losses.

Now there are several reasons why we have to consider hand-feeding for our stock. At present, our beef cattle and sheep are grown on natural pasturage. For these stock we only consider hand-feeding in times of drought. Here the object is to keep the stock alive, and we give them a mere "maintenance ration." For this purpose *silage* is eminently suited—fed at the rate of from 30 lb. to 60 lb. per day per 1,000 lb. of live weight (2 lb. to 4 lb. per day per sheep, 30 lb. to 60 lb. per day per head of cattle).

In this class of feeding it must be stressed that a "maintenance ration" only is being fed. This will keep the animals alive, but it has not sufficient quality to allow the animals to grow and produce, and it certainly is not fit for breeding stock or for young growing animals. A "maintenance ration" for stock is very much what a bread-and-water ration would be for man.

When feeding a "maintenance ration" only, we have this little problem before us. On the one side we have the cost of the feed plus the cost of labour for feeding. Against this we can place no gains. The net result must be a loss. The question therefore arises as to whether it would not pay better to add some concentrates or richer feed to the "maintenance ration," and so allow of a certain amount of growth and production? If this were done, the cost of the feed would increase, but there would be practically no increase in the cost of labour for

feeding. Against this there would be a gain because of the growth or production. *If the value of this gain were greater than the extra cost of feed, then it would pay.* But it is quite possible that *the value of the gain might more than pay for the whole cost of feed and of the labour for feeding. If so, an actual profit would result.*

One is not prepared to assert that an actual profit is possible from the hand-feeding of beef cattle and sheep during drought periods, but what can be asserted is that losses would be less if the feed given were of a quality higher than that contained in a "bare maintenance ration." To attain such a result, however, it is absolutely necessary that systematic conservation of fodder must be practised. There would be no chance of success if the feed has to be purchased at famine prices. *The basis of any such systematic conservation is the storage of large quantities of silage.*

To emphasise the matter let us go a little further.

First we must clearly understand what is meant by a maintenance ration. A maintenance ration is that quantity of food which contains just sufficient strength and quality to enable an animal to retain his present condition, whether good, bad, or indifferent, provided such animal is called on for no work or production. Practically it is only possible to feed such a ration to a mature animal at rest. For example, we can feed a true maintenance ration to a full-grown bullock or horse if we don't expect them to increase in weight or to do any work, but we cannot feed a mere maintenance ration to a milking cow, or to young stock, or to sheep producing wool, for the simple reason that some of the strength of the feed is used for the production of milk or flesh or wool, as the case may be. Just in so far as the feed is used for production, so there is a shortage for maintenance, and in consequence the animal falls off in condition. We all know how female stock will hold their own on poor food right to the time of bearing their young, and then die off. All that this means is merely this: As the time for bearing comes near, too much of the strength of the feed is used up to allow the young to grow, and, in consequence, insufficient remains to maintain the mother.

But there is a further point to be emphasised. The maintenance ration will only maintain the animal's existing condition. There is not sufficient quality in the ration to build up a low-conditioned animal. Therefore, if stock have been permitted to get into low condition, the feeding of a maintenance ration is not enough. To merely feed to keep such stock alive in their weakened state is to invite disaster when the rain comes. Such stock must be built up. Their feed must be richer and, in consequence, more expensive than the true maintenance ration. *Had the maintenance feed been fed sooner, it would have been sufficient; but once the stock get very low, their feed must be richer.* We might sum this up thus:—*Early feeding is cheaper feeding.*

Naturally a man depending on natural pasturage only will hesitate before purchasing feed. He will wait till the last moment, trusting for rain. But would he do this if he had conserved fodder?

But to return to the feeding of silage:—If the stock had no other feed, no picking in the paddocks, then feeding—

No. 1—50 lb. of silage per day to each 1,000 lb. of live weight would supply a maintenance ration which would keep the animals fairly healthy, though they would lose condition, as 50 lb. of silage does not contain quite sufficient body in it. If there is dry picking in the paddocks the stock would probably eat sufficient of it to make good the deficiency in the silage.

But if—

No. 2—40 lb. of silage were mixed with
10 lb. of bush hay chaff,

and this quantity of mixture fed to each 1,000 lb. live weight per day, they would be receiving a good maintenance ration. This mixture should enable the stock to hold their condition without loss of fat. Of course, if the paddocks contain some feed or picking, a lesser quantity of the feed may be used. How much less can only be determined by trial and carefully watching the stock to see they are not falling off.

Now, both the above rations merely enable the stock to hold their own. If the feeding is only for a short period, such a ration could be given to young stock and producing stock, as well as to mature animals. But if the feeding is over a prolonged period, rations No. 1 and No. 2 are only fit for grown stock (*see above*). There will be no gains, the expense incurred will only keep things as they are—in fact, No. 1 ration will scarcely do this. *Such feeding continued for a long time may easily involve an expenditure for feed which is in excess of the value of the stock saved.*

Let us now consider feeding a richer ration, for example:—

No. 3—40 lb. of silage mixed with
15 lb. of lucerne chaff,

this being sufficient per day for each 1,000 lb. live weight. Such a ration should allow of an increase of body weight of about 1 lb. per day.

A better fattening or producing ration would be as follows:—

No. 4—40 lb. of silage
10 lb. of lucerne chaff
5 lb. of bush chaff } or 7 lb. of corn and cob meal.
4 lb. of maize }

This ration should allow of an increase of body weight of 2 lb. per day.

With Nos. 3 and 4 it must be impressed that the quantities given refer to the case where the stock have no other feed. If the paddocks provide some fodder, either the above quantities may be reduced somewhat or else larger gains may be expected.

Whether such feeding would pay or not depends on a number of conditions, the chief of which is *that the required fodder has been conserved in good seasons when the cost of production is low*. It is impossible to make hand-feeding pay if famine prices have to be paid for the feed.

Beyond this we have the following:—

(1.) If the stock are not fed at all during the drought, they will receive a set-back. Whether deaths occur will depend largely on the severity of the drought. But the set-back is there, and when the rain comes it will take some time before the stock recover; in fact, the young stock never will recover completely. If it merely means that the stock are a year older at marketing, this will mean an added expenditure in production.

(2.) If ration No. 1 were fed, it would largely prevent the set-back to the stock, while the young stock would not suffer so badly. The danger of loss by death would be almost entirely obviated. Stock so fed would be in the position to take immediate advantage of the grass when it came, and so reach market sooner. This quicker marketing together with the prevention of loss by death is a gain to be set against the cost of feeding. Will it pay?

(3.) What has been said with reference to ration No. 1 can be said with more force with reference to ration No. 2. No. 2 ration is slightly more expensive, but it would keep all stock in better heart and leave them in condition to take rapid advantage of any grass that comes.

(4.) The main advantage in feeding ration No. 3 is that forward stores could be topped up and sold, thus relieving the property. Young stock would also be kept growing slowly. Thus some revenue would be obtained (and prices during the drought would probably be good for prime stuff) while the break of the drought would find all stock more advanced.

(5.) Ration No. 4 would have the same effect as No. 3, but would be just about twice as effective. It would not, however, be twice as expensive. Therefore if No. 3 didn't quite pay, it is more than likely that No. 4 would pay. In other words, *when hand feeding, heavy feeding is generally the cheaper.*

(6.) Obviously it would pay better if the stock fed are well-bred high-class animals; that is, animals which convert their food into marketable products at an efficient rate. Hand feeding low-class scrubs will not pay.

Before leaving the question of our beef stock and sheep, the following is given as a well-balanced ration suitable for young stud stock and mothering females:—

No. 5—30 lb. of silage,
10 lb. of lucerne chaff,
5 lb. of ground maize,
3 lb. of bran,
2 lb. of linseed meal.

This being sufficient per day for each 1,000 lb. of live weight.

FEEDING SILAGE TO DAIRY STOCK.

Whatever be the position with regard to our beef cattle and sheep, there can be no doubt as to the necessity to practise hand-feeding with our dairy stock. During a portion of each year they require it, in some years to a very much greater extent than in others, and then there are the drought years.

During each winter our natural pasturage goes off, and with the fading of the pasturage the milk yield falls. Certainly we might breed so as to have our cows freshen in the spring, but against this we have to place our ideal climate and also the higher price which milk products command in the winter.

In drought we cannot afford to lose our cows, for if a man is breeding well each cow and heifer represents years of careful grading up for production. It is not the individual cow that matters—it is the accumulation of years of breeding which she represents that we cannot afford to lose.

Let us first consider the case where hand-feeding is not practised. We must first fully realise that the dairy cow has been bred for the express purpose of converting her feed into milk. Her function is production. In milk, therefore, she must receive a ration in excess of mere maintenance. If, then, we are not hand-feeding, what takes place as the pastures fall off in condition in winter is this:—The feed available is of poor quality; the cow endeavours to fulfil her function of milk production; she also has to maintain herself; the food available is not good enough for both purposes, so the milk flow decreases, as also does



PLATE 7.—WOOL EXHIBIT, DEPARTMENTAL COURT—NATIONAL ASSOCIATION EXHIBITION, 1920.



PLATE 8.—SISAL FIBRE AND COTTON EXHIBITS, DEPARTMENTAL COURT—NATIONAL ASSOCIATION EXHIBITION, 1920.

the cow's condition, for she starves herself in her endeavour to produce milk. Incidentally, if she is carrying a calf the calf also suffers.

The problem before us is whether we can make hand-feeding pay better than the practice briefly described above. Perhaps the best way to approach the matter is to consider our feeding in two sections, that is, consider the ration for maintenance first, and the ration for production next.

A Maintenance Ration.

- No. 6—30 lb. of maize or sorghum silage,
5 lb. of oaten, wheaten, millet, or sudan grass chaff,
2 lb. of lucerne chaff.

This mixture is sufficient per day for each 1,000 lb. live weight, provided no other feed were available. It would maintain dry stock in excellent condition, but is not sufficient for growing heifers. What we should do is to feed little or much of this to all our stock, milkers included, in accordance with the condition of the paddocks.

Production Ration.

- No. 7—5 lb. of lucerne chaff,
2 lb. of bran,
5 lb. of maize meal.

This mixture would be sufficient to produce 20 lb. of 4 per cent. milk or 3 lb. of the mixture sufficient for each 5 lb. of 4 per cent. milk. This production ration is the expensive portion of the feed, hence we should feed to each milker in proportion to her normal supply of milk. Thus if at the time she is capable of giving 30 lb. of milk she should receive 18 lb. of the production ration, but only 6 lb. of the ration if she cannot produce more than 10 lb. of milk.

Assuming the following prices, we can work out a very interesting table:—

	£	s.	d.	
Silage	0	12	6	per ton
Lucerne chaff	4	0	0	per ton
Oaten chaff	4	0	0	per ton
Bran	6	0	0	per ton
Maize	0	4	0	per bushel

(These prices have been assumed somewhat in accord with costs as they would be if fodder conservation were systematically practised.) With these prices the full maintenance ration would cost 5d., and 3 lb. of the production ration would cost 2d. Then with milk worth, say, 7d. per each 10 lb. (nearly a gallon) we get the following table:—

Cost of:—				Costs.	Returns.	Loss.	Gain.	If paddock supplied Half Maintenance.	
								Loss.	Gain.
				d.	d.	d.	d.	d.	d.
Maintenance only				5	0	5	..	2½	..
Maintenance and 5 lb. milk ..				7	3½	3½	..	1	..
“ 10 “				9	7	2	..	..	0½
“ 15 “				11	10½	0½	..	..	2
“ 20 “				13	14	..	1	..	3½
“ 25 “				15	17½	..	2½	..	5
“ 30 “				17	21	..	4	..	6½
“ 35 “				19	24½	..	5½	..	8
“ 40 “				21	28	..	7	..	9½

This table illustrates clearly that it pays best to feed the heavy producers. Perhaps it is because too many of our dairy stock are low-grade producers that hand-feeding is not more generally practised.

In ration No. 6 the true position of silage as a feed for dairy stock is indicated. It is a succulent roughage to be used as a substitute for natural green stuff. It is not a good producing feed, but it serves as an excellent basis for the maintenance ration.

CONCLUSION.

In the above no attempt has been made to give a complete description of feeding. Many rations over and above those shown here can be used. All that has been intended was to illustrate how silage might be efficiently used. Should any reader wish for further information, he should apply to the College.

SUNFLOWER SILAGE.

Mr. J. F. Keane, Carbeen, Cairns district, who has on several occasions contributed useful and informative articles to this Journal on tropical agriculture, particularly on rice-growing, writes as follows on the subject of Sunflower Silage, an article on which appeared in the June issue of the Journal:—

“In April, 1873, I left Odessa (on the Black Sea) as third mate of a large steamer, the “Bladworth,” which carried a heavy cargo of sunflower seed for Nantes, in France, to be manufactured into a substitute for olive oil. I learnt from the shippers that the exportation of this seed was at that time a new trade, but sunflowers had been grown on large areas all over Southern Russia as the principal food of stalled animals from time immemorial. Owing to almost polar winters in that country, stock have to be housed for five or six months of the year. For myself I would not try to raise stock without the sunflower, though I were only able to give them an occasional handful. It acts just as beneficially on their health, no matter how much or what other kind of fodder they may be getting, as salt does on the condition of animals on green pasture.”

The sunflower known as the “Giant Russian” grows so easily and thrives so well in all parts of Queensland that it is surprising that the seed has not, as far as we know, been fed to stock. As an oil-producer, also, it is of great value. Unfortunately, owing to the absence of oil mills, neither this nor olive, cotton, or castor oils, which are largely imported from Europe, are produced in Queensland. Should, however, cotton-growing on a large scale once more be vigorously taken up by farmers, of which there is some prospect, owing to a good price being guaranteed to them for their crops, we may some day see the erection and working of oil mills.

Mr. Keane was an enthusiastic ricegrower, and constantly advocated the cultivation of Upland rice in this State. But few were found willing to raise this valuable crop, notwithstanding the fact that large quantities of rice are imported, and that even in New Guinea (Papua) rubber and coconut planters imported rice to feed the native labourers, whereas it is a crop which succeeds admirably in all parts of the Territory.

IRRIGATION OF THE WOONGARRA SUGAR DISTRICT, BUNDABERG, No. 2.

(Continued.)

In the August number of the Journal, we described the facilities for irrigating this fertile tract of country afforded by the Elliot River. But before this, the cane-growers tried to obtain the much-needed water from wells sunk through rock, sandstone, and clay to a maximum depth of, in some cases, nearly 200 feet. We have no space to give to the details of the results, but, generally, only a few of the wells yielded a supply from 100 gallons per day to 5,000 gallons per hour, mostly brackish.

The cost of these wells ranged from 20s. to 50s. per foot, and summarising the average cost, it amounted to £3 8s. 10d. per acre merely to find water, and had it come about that the Elliot River scheme fructified, then a water rate of £3 per acre would have been most moderate, as the farmers would then not have been obliged to set up each a separate plant costing between £300 and £500.

We have a record of thirty wells in the Woongarra district, amongst which no water was struck in four. In fourteen others, the water proved to be salt, or, at the best, brackish, and in only seven was the water good enough for irrigation. From these figures, it will be seen that if each of these thirty wells had struck good water, and that each well were made to irrigate 50 acres, this would amount to one-half the area which it was intended to irrigate from the Elliot River.

The cost of sinking these wells ranged from 25s. to 50s. per foot, amounting in all to an expenditure of £5,163 in what was practically prospecting. One bore was sunk through 170 feet of solid rock, others from 20 to 110 feet of solid rock, and many, after getting through many feet of hard basalt, boulders, and sandstone, encountered sandstone and clay before reaching water. Dividing the cost of this prospecting amongst thirty farmers, it will be seen that the cost on an average amounted to £3 8s. 10d. per acre merely to find the water, after which would come the cost of engine and boiler, pump, piping, fluming, &c., to be added to the expense originally incurred.

On the other hand it follows, seeing that good water has been found below the surface in several parts of the Woongarra, that there must be a continuous supply of subterranean water in the district unless the wells have been sunk on extinct craters filled with water and having no connection with each other. At the Sandhills, 12 miles from Bundaberg, there was a shallow well in the sand on the sea beach, not far above high-water mark, from which a continuous supply of excellent drinking water was obtained during a severe drought, not only for domestic use, but also for the needs of all the stock in the Woongarra district. It would have been interesting to follow up the course of this water inland by a series of trial bores, which might have led to important discoveries in the Woongarra.

To understand the difficulties which had to be encountered in the matter of reaching the underground water in this particular district, it should be noted that the Burdekin delta was originally on the same level as Fairymead; but in pre-historic times the overflow of lava from the Hummock covered up the level land, and consequently 100 feet or more have to be passed through before reaching the sweet water at the same level as at Fairymead.

The Woongarra was the first district to be constituted an irrigation area. At a meeting of farmers interested in the Woongarra irrigation, held in May, 1902, Mr. John White, M.L.A., in the chair, the remarks of that gentleman were thus reported in the "Bundaberg Mail"—

"By an Order in Council, the farmers there have the sole control of that fine river, the Elliot, from its source to the limit of tidal influence. He congratulated them on this fact. There was no doubt as to the value of irrigation. They had control of one of the best water supplies, and trusted they would make use of it at an early date. As to the quantity of water available from this source, he was satisfied there was enough and to spare for all their requirements. They might not be able to deluge their land with water, but that there would be sufficient to enable them to get a most gratifying return for their outlay he felt absolutely confident. The cost of the installation would be about £70,000.

"On the annual field-day at Murgon on 5th June last, Mr. Cattermull recalled that some years ago the abovementioned irrigation scheme was launched in the Woongarra, but unfortunately it had been turned down. He thought they were all agreed to-day that the time had arrived when that scheme or some other scheme with the same object in view should be resurrected, and given effect to. They had an abundance of good water located some 8 miles away from the Woongarra, where some 12,000,000 gallons were flowing away every twenty-four hours, and the Government Hydraulic Engineer had stated that the total available could be triplicated if they threw a wall across the stream. He sincerely hoped that something would be done in the matter of irrigation. The scheme was one in which they could reasonably ask the Government to help them. It was stated that, under irrigation, the Woongarra would produce vastly more than it does to-day, and every individual in the community would benefit by it. It behoved every property-owner to put his back to the wall to carry a system of irrigation through."

Whatever scheme is finally adopted, the benefit to the canegrowers will be very great.

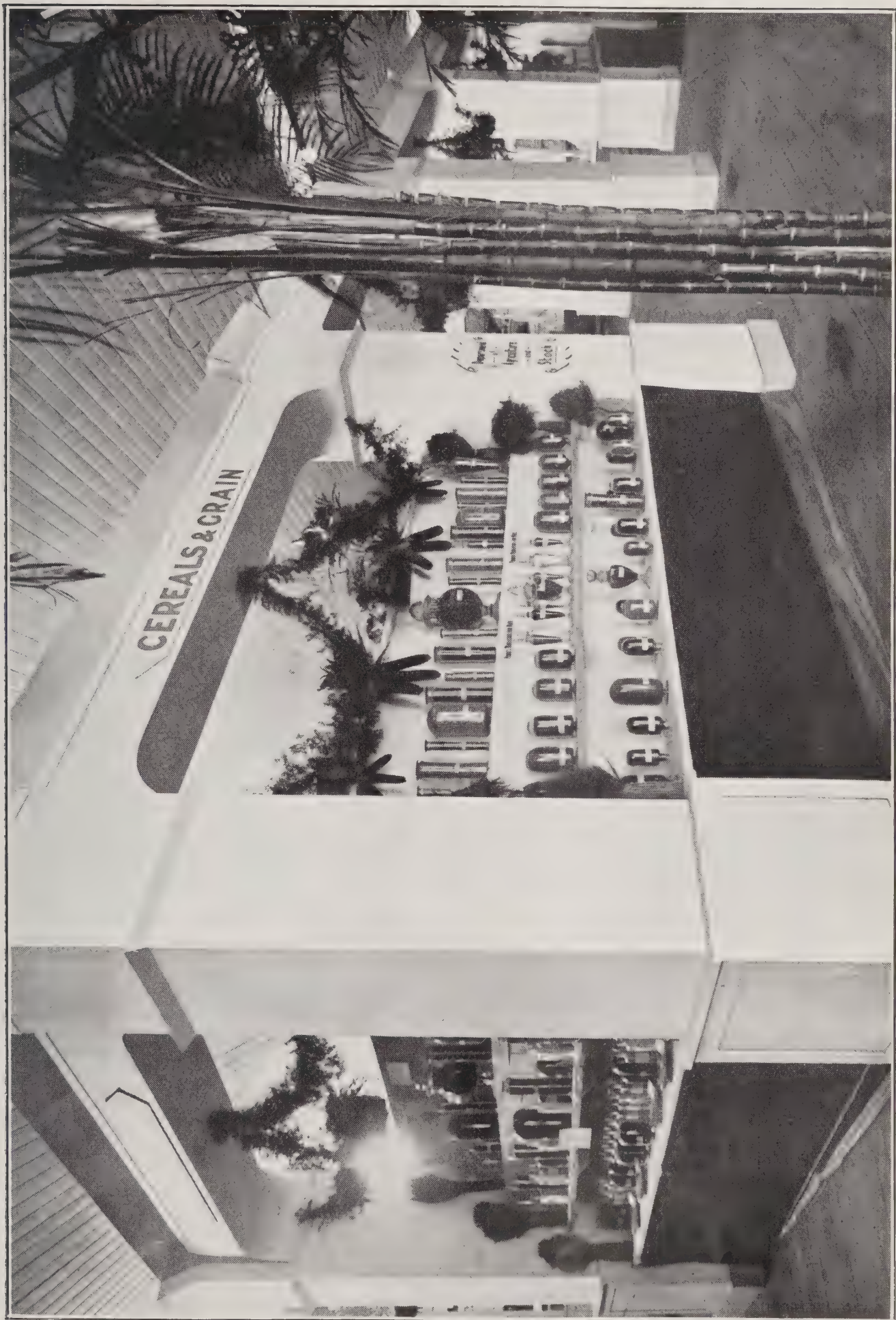


PLATE 9.—CEREALS AND GRAIN EXHIBIT, DEPARTMENTAL COURT—NATIONAL ASSOCIATION EXHIBITION, 1920.



PLATE 10.—PURE SEEDS EXHIBIT, DEPARTMENTAL COURT—NATIONAL ASSOCIATION EXHIBITION, 1920.

EXHIBITION NOTES, 1920.

THE NATIONAL ASSOCIATION'S EXHIBITION, JULY, 1920.

Coincidentally with the arrival of His Royal Highness the Prince of Wales, the Annual Exhibition of the Queensland National Association, which, owing to the war conditions, lapsed last year, was revived most successfully last July, and is generally and appropriately christened "The Prince's Show." The Council and members of the National A. and I. Association cannot but be satisfied in the highest degree with the results of their efficient work in the preparation of what well deserves to be looked upon as the best Exhibition of the many which have been annually presented at Bowen Park.

THE DISTRICT EXHIBITS

especially deserve mention, as do also the one-farm sections. Each district had brought of its best to compete for the much-coveted awards. A visit to these exhibits gave a most favourable impression of the wonderful capabilities of the pastoral, agricultural, mining, and other industrial occupations of the dwellers in the country districts. Not only were the products of the soil from almost all parts of the State presented to the view, but those which more particularly pertain to domestic economy were particularly interesting. The exhibitors in the one-farm section in particular are to be commended for not only farm products, but for the variety of manufactured luxuries in the shape of jams, jellies, pickles, and a host of other domestic productions. The judges must have had a difficult duty in judging, where all seemed to be worthy of distinction. The districts represented were the North Coast, South Coast, Central, Kingaroy, Gympie, Fassifern, and West Moreton.

On this occasion the district exhibits were classified according to the class of exhibits, a distinction being made between agricultural products, manufactures, minerals, and other primary products.

Our space will not admit of a lengthy description of the various exhibits of each district. Suffice it to say that these included, in both A and B grade, tropical products such as sugarcane, cassava, arrowroot, and ginger, besides many varieties of maize, sweet potatoes, English potatoes, and almost every description of vegetable, and fruits of splendid quality. Fodder crops, chaff of different kinds, ensilage, broom millet, peanuts, and many other products of the soil were also largely in evidence. The one-farm prize was gained by Mr. W. Hughs, of New South Wales, who scored 283 against 271 points gained by Mr. J. Donges, of Drayton.

ONE-FARM EXHIBITS.

	Possible Points.	J. Donges.	W. Hughs.
DAIRY PRODUCE (50)—			
Butter, 6 lb.	25	20	18
Cheese, 1 large or 2 small	20	10	15
Eggs, 1 dozen	5	3	3
	50	33	36
FOODS (60)—			
Hams, 15 lb., bacon 15 lb.	20	12	15
Cured, smoked, spiced, beef and mutton	10	8	4
Honey, 12 lb.	10	6	9
Beeswax, 6 lb.	5	4	0
Bread, 2-lb. loaves, scones, 1 doz.	5	5	1
Confectionery and sweets, 3 lb.	5	4	3
Lard, tallow, oils	5	2	4
	60	41	36

ONE-FARM EXHIBITS—*continued.*

	Possible Poist.	J. Douges.	W. Hughes.
FRUIT, VEGETABLES, AND ROOTS (fresh and preserved, (143)—			
Fresh fruits, all kinds	25	15	12
Dried fruits	10	5	5
Preserved fruits and jam	15	11	14
Fresh vegetables	15	10	10
Pickles, sauces, &c.	15	10	12
Potatoes, 56 lb., and roots	25	15	12
Table pumpkins, squashes, marrows	10	5	8
Cocoanuts and nuts	3	2	3
Vegetable and garden seeds	5	3	4
Arrowroot, 10 lb.	5	0	4
Cassava, 3 lb.	5	0	0
Ginger, 3 lb.	5	..	..
Sugar beet	5	1	..
	143	77	84
GRAINS, &C.—(70)—			
Wheat	25	2	..
Maize	20	8	12
Barley	10	2	2
Oats, rye, and rice	15	4	4
	70	16	18
TROPICAL PRODUCTS (45)—			
Sugar-cane, 24 stalks or 1 stool	30	..	..
Cotton in seed, 10 lb., long staple	10	..	8
Coffee, 10 lb	5	..	4
	45	..	12
TOBACCO (10)—			
Tobacco leaf, dried, 5 lb.	10	..	5
Hay, oaten, wheaten, lucerne, &c.	20	10	6
Grasses and their seeds	10	8	7
Chaff, oaten, wheaten, lucerne	20	..	..
Ensilage, any form	15	4	..
Cattle fodder, including pumpkins	15	6	..
Sorghum and millet	10	8	7
Hemp, 5 lb.	5	..	4
Flax, 5 lb.	5	4	4
Cowpeas, seed, 7 lb.	7	6	5
Broom millet, 10 lb.	10	4	8
	117	67	47
WOOL (25)—			
Greasy, 5 fleeces	20	..	12
Mohair	5	..	..
	25	..	12
DRINKS, &C. (10)—			
Temperance drinks, 6 bottles	10	4	8
WOMEN'S AND CHILDREN'S WORK (30)—			
Needlework, knitting, fine art	10	9	6
School work, maps, writing, &c.	10	..	..
Fancy work	10	8	8
	30	17	14
Miscellaneous articles of commercial value			
Plants and flowers in pots	5	2	..
Time and labour-saving, useful articles, made on the farm	10	4	..
Effective arrangement of exhibits	10	6	9
	590	271	283



PLATE 11.—NATIVE GRASSES, SUGAR-CANE, AND SORGHUM EXHIBITS, DEPARTMENTAL COURT —NATIONAL ASSOCIATION EXHIBITION, 1920.



PLATE 12.—NATIVE GRASSES EXHIBIT, DEPARTMENTAL COURT—NATIONAL ASSOCIATION EXHIBITION, 1920.

DETAILS OF THE DISTRICT EXHIBITS.
“ A ” GRADE.

	Possible Points.	South Coast.	West Moreton.	Wide Bay and Burnett.	Central Queensland.
DAIRY PRODUCE (170)—					
Butter, 1 box	80	71	67	70	68
Milk, condensed, concentrated, or dried ..	30	..	24	..	..
Cheese, 1 cwt.	40	36	34	34	35
Eggs	20	6	12	10	6
	170	113	137	114	109
FOODS (180)—					
Ham and bacon	50	42	30	31	37
Rolled and smoked beef and mutton ..	30	18	14	8	8
Smallgoods and sausages, if smoked or pre-served	10	8	7	4	6
Fish, smoked, &c.	10	3	6	..	6
Canned meat	25	10	..	..	20
Lard, tallow, and oils	20	17	14	12	14
All butchers' by-products, not included in any other part of scale of points	10	4	7	6	8½
Honey and its by-products	15	10	12	8	8
Confectionery	10	5	10	7	10
Bread, biscuits, scones, and cakes	10	6	10	6	10
	180	123	110	82	127½
FRUIT, VEGETABLES, AND ROOTS, fresh, preserved (200)—					
Fresh fruits all kinds	60	30	24	14	27
Preserved fruits, jams, &c.	30	28	12	11	24
Dried fruits	10	..	3	7	5
Fresh vegetables, all kinds, except potatoes	20	13	11	7	9
Preserved and dried vegetables, pickles, sauces, &c.	10	4	6	9	9
Potatoes	40	30	31	29	28
Roots, all kinds, and their products, arrow-root, cassava, meal, &c.	14	13	9	12	8
Cocoanut and nuts	6	4	3	5	4
Vegetable seeds	10	6	7	8	5
	200	128	106	102	119
GRAIN, &C. (150)—					
Wheat, flour, bran, pollard, and meals prepared therefrom	60	6	8	55	40
Maize, maizena, meals, starch, glucose, and cornflour	60	45	52	46	40
Barley, malt, pearl barley	20	6	6	17	10
Oats, rye, rice, and their meals	10	4	..	8	6
	150	61	66	126	96
MANUFACTURES AND TRADES (120)—					
All woodwork	20	10	10	8	10
All metal and iron work	20	8	15	18	15
Leather and all leather work and tanning ..	20	3	10	18	9
Manufactured woollen and cotton fibre ..	20	..	18	6	7
All tinwork	10	8	5	7	6
Artificial manures	10	9	4	7	6
Brooms and brushes	10	4	5	9	7
Manufactures not otherwise enumerated ..	10	5	7	5	6
	120	49	74	78	66

"A" GRADE—*continued*.

	Possible Points	South Coast.	West Moreton.	Wide Bay and Burnett.	Central Queensland.
MINERALS AND BUILDING MATERIALS (95)—					
Gold, silver, and precious stones	25	..	..	15	20
Coal, iron, other minerals, and salt	30	4	17	20	28
Stone, bricks, cement, marble, terra-cotta ..	20	19	15	8	14
Woods, dressed and undressed	20	15	10	12	10
	95	38	42	55	72
TROPICAL PRODUCTS (150)—					
Sugar-cane	60	48	12	40	45
Sugar, raw and refined	20	4	..	12	3
Rums, spirits, and by-products	10	8	4	8	..
Coffee (raw and manufactured), tea, and spices	10	3	1	2	1
Cotton (raw) and by-products	30	8	14	25	18
Rubber	10	..	..	..	..
Oils, medical and machinery	10	7	..	4	..
	150	78	27	91	67
WINES, & C. (30)—					
Wines	15	10	7	15	7
Aerated and mineral spa water	6	4	6	3	3
Vinegar and cordials	9	7	5	5	9
	30	21	18	23	19
TOBACCO (20)—					
Tobacco, cigar, and pipe, in leaf	20	7	12	15	15
HAY AND CHAFF, & C. (160)—					
Oaten, wheaten, lucerne, and other hay ..	30	13	20	20	30
Grasses and their seeds	10	2	4½	5	10
Oaten, wheaten, lucerne, and other chaffs ..	50	24	38	34	46
Ensilage and other prepared cattle fodder ..	20	8	18	12	7
Sorghum and millet	10	5	6	7	10
Commercial fibres (raw and manufactured) ..	10	3	6	6	8
Pumpkins and other green fodder	10	7	8	7	6
Hemp and flax	10	..	..	5	6
Broom millet	10	9	5	7	6
	160	71	105½	103	129
WOOL, & C. (110)—					
Scoured wool	40	30	20	30	40
Greasy wool	60	45	45	52	60
Mohair	10	..	7	9	5
	110	65	72	91	105
LADIES' WORK (20)—					
Needlework, knitting, fine art	10	7	5	7	5
School work, maps, writing, &c., for pupils of schools in the district	10	5	10	5	6
	20	12	15	12	11
EFFECTIVE ARRANGEMENT (50)—					
For effective arrangement of exhibits, with a maximum of 300 points	50	30	50	25	45
Totals	1,455	796	834½	917	980½

" B " GRADE.

There were three competitors in the "B" grade, which was won by Fassifern with 811 points out of a possible 1,230 points. Gympie came second with 793 points, and Kingaroy third with 681 points.

Following are the details:—

	Possible Points.	Kingaroy.	Gympie.	Fassifern.
DAIRY PRODUCE (170)—				
Butter	90	80	82	79
Cheese	60	49	36	50
Eggs	20	8	12	14
	170	137	140	143
FOODS (120)—				
Hams, bacon, rolled, and smoked meat and mutton	50	15	28	30
Fish, smoked	10	..	..	4
Lard, tallow, and oils	15	6	6	11
Honey and its by-products	25	8	14	16
Confectionery	10	7	10	8
Biscuits, bread, cakes, and scones	10	8	8	10
	120	44	66	79
FRUIT, VEGETABLES, AND ROOTS, fresh and preserved (185)—				
Fresh fruits of all kinds	60	13	29	27
Prepared fruits and jams, &c., prepared by farmer	20	16	17	16
Dried fruits, prepared by farmer	5	3	3	3
Fresh vegetables, all kinds, except potatoes	20	7	15	13
Preserved and dried vegetables, pickles, sauces, &c.	10	9	8	7
Potatoes	40	20	21	34
Roots (all kinds), and their products, arrow-root, cassava, meals, &c.	10	6	8	8
Cocoanut and nuts	10	8	6	6
Vegetable seeds	10	7	4	5
	185	89	121	119
GRAIN, &C. (150)—				
Wheat, flour, bran, pollard, macaroni, and meals prepared therefrom	60	40	35	22
Maize, maizena, meals, starch, glucose, and cornflour	60	45	48	55
Barley, malt, and pearly barley	20	10	12	10
Oats, rye, rice, and their meals	10	5	8	7
	150	100	103	94
WOODS—				
Dressed and undressed	20	10	10	10
Wattle bark	20	10	11	10
	40	20	21	20
Hides				
	20	15	15	30

"B" GRADE—*continued*.

	Possible Points.	Kingaroy.	Gympie.	Fassifern.
MINERALS (50)—				
Gold, silver, and precious stones	25	..	12	..
Coal, iron, and other minerals and salt ..	25	7	14	9
	50	7	26	9
TROPICAL PRODUCTS (115)—				
Sugar-cane	75	2	55	19
Coffee (raw and manufactured), tea, and spices	10	1	1	2
Cotton (raw) and by-products	30	4	6	10
	115	7	62	31
Tobacco, cigars, &c. .. .	20	16	8	7
HAY, CHAFF, &C. (180)—				
Oaten, wheaten, and other hay	40	25	26	33
Grasses and their seeds	10	6	5	7
Oaten, wheaten, lucerne, and other chaffs	60	35	37	45
Ensilage and other prepared cattle fodder ..	20	9	10	15
Sorghum and millets	10	9	6	9
Commercial fibres (raw and manufactured)	10	7	5	8
Pumpkins and other green fodder	10	7	6	9
Hemp and flax	10	7	4	4
Broom millet	10	9	7	8
	180	114	106	138
WOOL, &C. (110)—				
Scoured wool	40	33	34	34
Greasy wool	60	40	47	52
Mohair	10	6	8	7
	110	79	89	93
LADIES' WORK (20)—				
Needlework, knitting, and fine arts ..	10	5	6	5
School work, maps, writing, &c., for pupils of schools in district	10	7	5	10
	20	12	11	15
EFFECTIVE ARRANGEMENTS (50)—				
For effective arrangement of exhibits ..	50	40	25	50
Totals	1,230	681	793	811

DETAILS OF CHEESE EXHIBITS.

Two export cheeses, 70-80 lb., to be not more than three weeks old prior to storing, white, suitable for English market. Exhibits to be placed in cold stores six weeks prior to July 26. First prize £5 5s., second £3, third £1.

	Flavour.	Texture.	Colour.	Finish.	Total.
Possible points	50	25	15	10	100
Downs Co-operative Dairy Co., Ltd., Hodgson's Vale	47	24	14½	9½	95
Greenmount Dairy Co., Ltd.	46	24	15	9	94
Pittsworth Dairy Co., Ltd., Scrubby Mount	45	24½	14½	9½	93
Greenmount Dairy Co., Ltd.	45	24	14½	9	92½
Gayndah Co-operative Dairy Co., Ltd., Byrnestown	45	24½	14	8½	92
Greenmount Dairy Co., Ltd.	44	24	14½	9	91½
Greenmount Dairy Company, Limited	45	24	14	8½	91½
Pittsworth Dairy Company, Limited	44	24	14	9	91
Southbrook Co-operative Dairy Company	44	23½	14	8½	90
Lauriston Co-operative Dairy Company, Limited	43½	23½	14	8½	90
Sunnyvale Co-operative Cheese Company, Limited	44	23	14½	8½	90
Woodleigh Cheese Factory	42	24	14	9	89
Gayndah Co-operative Dairy Company, Limited	43	24	14	8	89

Two export cheeses, 70-80 lb. to be not more than three weeks old prior to storing. Coloured, suitable for English market. Exhibits to be placed in cold stores six weeks prior to July 26th. First prize, £5, second £3, third £1.

	Flavour.	Texture.	Colour.	Finish.	Total.
Possible points	50	25	15	10	100
Downs Co-operative Dairy Company, Limited, Hodgson's Vale	47	24½	14	9½	95
Greenmount Dairy Company, Limited	47	24½	14½	8½	94½
Greenmount Dairy Company, Limited	40	24	14½	9½	94
Downs Co-operative Dairy Company, Limited, Gowrie Junction	46	24	14½	9	93½
Pittsworth Dairy Company, Limited, Scrubby Mount	45½	24½	14	9½	93½
Greenmount Dairy Company, Limited	46	24½	14½	9	93
Pittsworth Dairy Company, Limited	46	24	13½	9	92½
Pittsworth Dairy Company, Limited, Springside	45	24	14	9½	92½
Woodleigh Cheese Factory	45	24	14½	9	92½
Rosalie Cheese Factory	45	24½	14½	8	92
Warwick Butter and Dairying Co., Limited	45	24½	13½	9	92
Gayndah Co-operative Dairy Company, Limited, Byrnestown	44	24½	14	9	91½
Lauriston Co-operative Dairy Company	44	24	14	9	91
Greenmount Dairy Company, Limited	46	24½	13½	7	91
Downs Co-operative Dairy Company, Limited, Koondai	43	24	14	9	90
Sunnyvale Co-operative Cheese Company, Limited	43½	24	13½	9	90
Gayndah Co-operative Dairy Company, Limited, Binjour	42	23½	13	8½	87

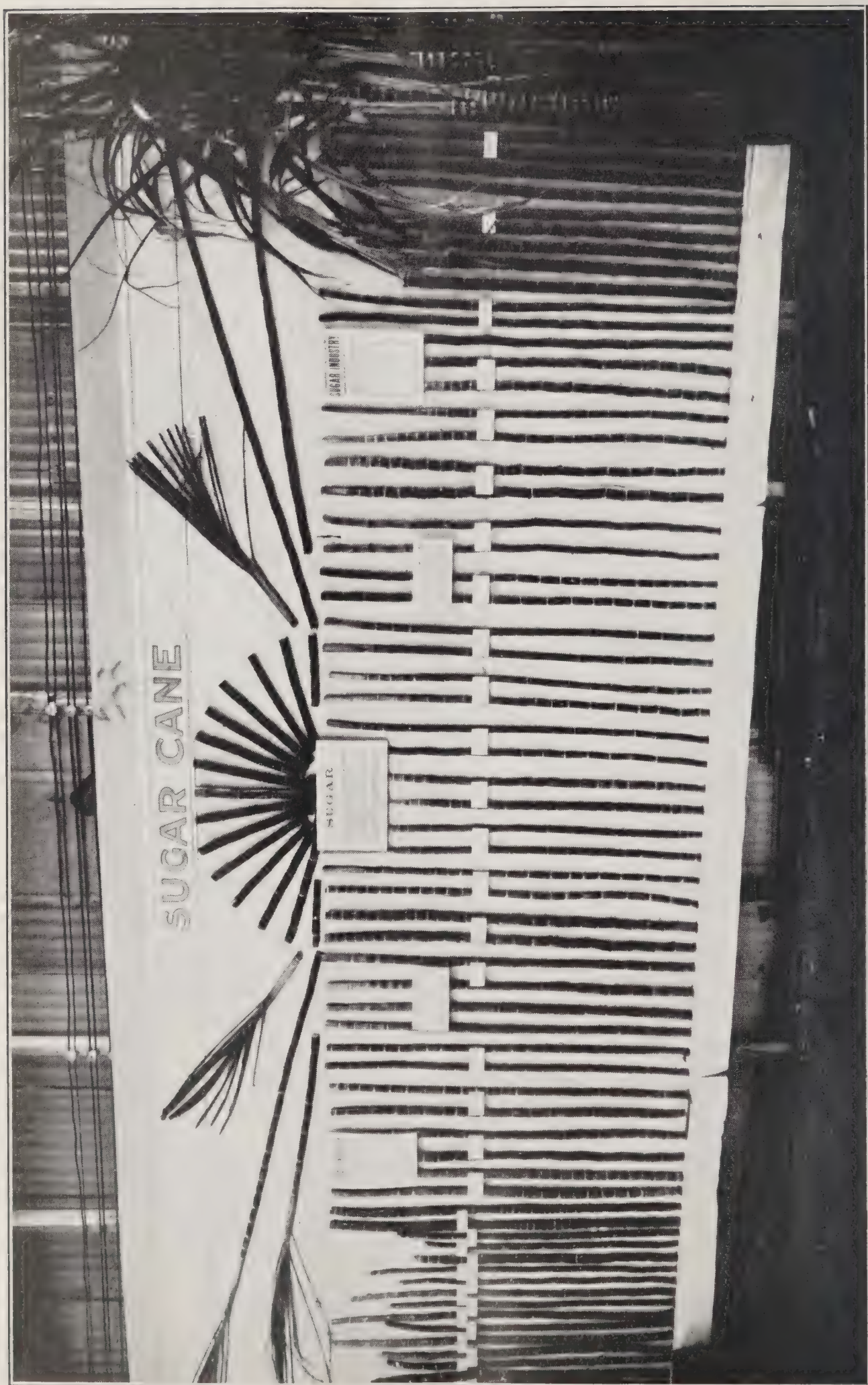


PLATE 13.—SUGAR-CANE VARIETIES EXHIBIT, DEPARTMENTAL COURT—NATIONAL ASSOCIATION EXHIBITION, 1920.

BUTTER EXHIBITS.
ONE BOX (SALTED) 30 DAYS' STORAGE.

	Flavour.	Texture.	Colour.	Salting.	Packing and Finish	Total.
Possible Points	65	20	7	4	4	100
Singleton Central Co-operative Dairy Company, N.S.W.	59	19	7	4	4	93
Downs Co-operative Dairy Company, Limited, Toowoomba Central	58	19½	7	4	4	92½
Queensland Farmers' Co-operative Company, Limited, Boonah	57½	19½	7	4	4	92
Downs Co-operative Dairy Company, Dalby	57	19	7	4	4	91
Dungong Co-operative Butter Factory, N.S.W.	56	19	7	4	4	90
Wide Bay Co-operative Dairy Company, Gympie	56	19	7	4	4	90
Queensland Farmers' Co-operative, Booval	56	19	7	4	4	90
Oakey District Co-operative Butter Company, Crosshill	56	19	7	4	4	90
Maryborough Co-operative Dairy Company, Kingaroy	56	16	7	7	4	90
Logan and Albert Co-operative Dairy Company, Limited, Beaudesert	56	19	7	4	4	90
Dorrigo Co-operative Dairy Company, Limited, N.S.W.	56	19	7	4	4	90
Warwick Butter and Dairying Company, Texas	56	19	7	4	4	90
Warwick Butter and Dairying Company, Allora	56	19	7	4	4	90
Maryborough Co-operative Dairy Company, Limited, Biggenden	55½	19	7	4	4	98½
Maryborough Co-operative Dairy Company, Limited, Mundubbera	56	18½	7	4	4	89½
Downs Co-operative Dairy Company, Limited, Clifton	55	19	7	4	4	89
Caboolture Co-operative Dairy Company, Limited, Pomona	56	19	7	4	3	89
Goombungee Co-operative Dairy Company, Limited, Goombungee	55	19	7	4	4	89
Warwick Butter and Dairying Company, Limited, Goondiwindi	55	19	7	4	4	89
Warwick Butter and Dairying Company, Limited, Millhill	55	19	7	4	4	89
Queensland Farmers' Co-operative Limited, Laidley	55	18	7	4	4	88
Maryborough Co-operative Dairy Company, Limited, Maryborough	55	18	7	4	4	88
Wide Bay Co-operative Dairy Company, Limited, Cooroy	55	18	6	4	4	88
Queensland Farmers' Co-operative Company, Limited, Grantham	54	18	7	4	4	87
Gayndah Co-operative Dairy Company, Limited, Gayndah	54	19	7	3	4	87
Kin Kin Co-operative Dairy Company, Limited, Kin Kin	53	18	7	4	4	86
Caboolture Co-operative Dairy Company, Limited, Caboolture	48	19	7	4	3	82

ONE BOX (SALTED) EIGHT WEEKS' STORAGE.

Queensland Farmers' Co-operative Company, Limited, Boonah	58	20	7	4	4	93
Maryborough Co-operative Dairy Company, Limited, Kingaroy	58	19½	7	4	4	92½
Downs Co-operative Dairy Company, Limited, Toowoomba Central	57	20	7	4	4	92

BUTTER—*continued.*ONE BOX (SALTED) EIGHT WEEKS' STORAGE—*continued.*

	Flavour.	Tenure.	Colour.	Salting.	Packing and Finish.	Total.
Warwick Butter and Dairying Company, Limited, Mill Hill	57½	19	7	4	4	91½
Dungog Co-operative Butter Factory, Limited, N.S.W.	56½	19½	7	4	4	91
Wide Bay Co-operative Dairy Company, Limited, Gympie	57	19	7	4	4	91
Oakey District Co-operative Butter Company, Limited, Crosshill	57	19	7	4	4	91
Goombungee Co-operative Dairy Company, Limited, Goombungee	56½	19½	7	4	4	91
Dorriggo Co-operative Dairy Company, Limited, N.S.W.	57	19	7	4	4	91
Warwick Butter and Dairying Company, Limited, Goondiwindi	57	19	7	4	4	91
Singleton Central Co-operative Dairy Company, Limited, N.S.W.	56½	19	7	4	4	90½
Warwick Butter and Dairying Company, Limited, Allora	56½	19	7	4	4	90½
Downs Co-operative Dairy Company, Limited, Dalby	56	19	7	4	4	90
Queensland Farmers' Co-operative Company, Limited, Booval	56	19	7	4	4	90
Queensland Farmers' Co-operative Company, Limited, Laidley	55½	19½	7	4	4	90
Logan and Albert Co-operative Dairy Company, Limited, Beaudesert	56	19	7	4	4	90
Warwick Butter and Dairying Company, Limited, Texas	56	19	7	4	4	90
Wide Bay Co-operative Dairy Company, Limited, Cooroy	55	19	7	4	4	89
Queensland Farmers' Co-operative Company, Limited, Grantham	55	19	7	4	4	89
Caboolture Co-operative Dairy Company, Limited, Caboolture	56	19	7	4	4	89
Maryborough Co-operative Dairy Company, Limited, Mundubbera	56½	18½	7	4	4	89
Maryborough Co-operative Dairy Company, Limited, Biggenden	55	18½	7	4	4	88½
Maryborough Co-operative Dairy Company, Limited, Maryborough	54	19	7	3	4	87
Gayndah Co-operative Dairy Company, Limited, Gayndah	54	18	7	4	4	87
Kin Kin Co-operative Dairy Company, Limited, Kin Kin	53	18	7	3	4	85

ONE BOX (UNSALTED) EIGHT WEEKS' STORAGE.

Downs Co-operative Dairy Company, Limited, Dalby	58½	19½	7	4	..	89
Maryborough Co-operative Dairy Company, Limited, Maryborough	58	19½	7	4	..	88½
Dungog Co-operative Butter Factory, Limited, N.S.W.	57½	19½	7	4	..	88
Queensland Farmers' Co-operative Company, Limited, Laidley	57½	19	7	4	..	87½
Downs Co-operative Dairy Company, Limited, Toowoomba Central	57	19½	7	4	..	87½
Wide Bay Co-operative Dairy Company, Limited, Cooroy	56½	19½	7	4	..	87
Maryborough Co-operative Dairy Company, Limited, Biggenden	57	19	7	4	..	87

BUTTER—continued.

ONE BOX (UNSALTED), EIGHT WEEKS' STORAGE—continued.

	Flavour.	Texture.	Colour.	Salting.	Packing and Finish.	Total.
Possible points	65	20	7	4	4	100
Warwick Butter and Dairying Company, Limited, Allora	57	19	7	4	..	87
Wide Bay Co-operative Dairy Company, Limited, Gympie	56½	19	7	4	..	86½
Queensland Farmers' Co-operative Company, Limited, Booval	56½	19	7	4	..	86½
Goombungee Co-operative Dairy Company, Limited, Goombungee	56½	19	7	4	..	86½
Warwick Butter and Dairying Company, Limited, Texas	56½	19	7	4	..	86½
Queensland Farmers' Co-operative Company, Limited, Boonah	56	19	7	4	..	86
Oakey District Co-operative Butter Company, Limited, Crosshill	56	19	7	4	..	86
Caboolture Co-operative Dairy Company, Limited, Caboolture	56	19	7	4	..	86
Maryborough Co-operative Dairy Company, Limited, Kingaroy	57	19	7	3	..	86
Maryborough Co-operative Dairy Company, Limited, Mundubbera	56	19	7	4	..	86
Logan and Albert Co-operative Dairy Company, Beaudesert	56	19	7	4	..	86
Dorrigo Co-operative Dairy Company, Limited, N.S.W.	56	19	7	4	..	86
Warwick Butter and Dairying Company, Limited, Goondiwindi	56	19	7	4	..	86
Warwick Butter and Dairying Company, Limited, Mill Hill	56½	18½	7	4	..	86
Queensland Farmers' Co-operative Company, Limited, Grantham	55½	19	7	4	..	85½
Kin Kin Co-operative Dairy Company, Kin Kin	55	19	7	4	..	85

THE DEPARTMENT OF AGRICULTURE

was well represented, especially in the exhibits of sugarcane, the different varieties of which were well classified. The following is a brief description of the general decorative scheme adopted this year by the Department, and arrayed by Mr. H. W. Mobsby, Artist and Photographer to the Department:—

The Court of the Stock Department of Agriculture and Stock at the Show this year was of a quadrangular setting of massive-looking columns and headings, situated as usual on the Gregory terrace side of the annexe. At each of the four corners of the quadrangle were displays of cotton, wool, Northern products, and pure seeds and cereals and grain, with two intermediate displays of sisal fibre, ropes and cordage on the centre of the main avenue front, and an exhibit of the work of the Stock Institute on the centre of the Gregory terrace avenue. On the wall of this avenue were shown exhibits of ensilage from the Q. A. College, native grasses, etc., from the Government Botanist's branch, varieties of sugarcane from the Sugar Experiment Stations, Mackay and Babinda, examples of fodders, etc., and a general Northern collection of Tropical Produce. On the wall at right angles to this, and on the top side of the Court, were examples of the work of the Government Entomologist and Pathologist's Branch, shown in natural-coloured enlargements, also cases containing "Life histories" of the several insects and pests. Situated in the centre of the Court was a trophy of octagonal design displaying general agriculture and fruits of Northern, Southern and Western Queensland, comprising varieties of wheats



PLATE 14.—ENTOMOLOGICAL EXHIBIT, DEPARTMENTAL COURT—NATIONAL ASSOCIATION EXHIBITION, 1920.



PLATE 15.—CATTLE PARADE—NATIONAL ASSOCIATION EXHIBITION, 1920—OPENING DAY.

in sheaf and glass; also varieties of maize, grains, etc. On each of the sections were sloping panels displaying maize, wheat, cowpea, and kaffir corn, each representing in design the "Prince of Wales Feathers," made of the grain; the panels between each of these contained displays of citrons and other fruits of Northern and Southern Queensland. Immediately above these panels were standing sheaves of wheat, supported by heads of fodder, grasses and grain in glass, and surmounting all was a central emblematical feature in the form of an "Imperial Crown," correct in all details, including the gems, but represented entirely by the varieties and colours of maize, "King of Grain."

An important feature of the Court was the comprehensiveness of the display, forming an interesting exhibit of educational value, and depicting the operations of the Department of Agriculture and Stock, in no small degree, at the same time having a clear floor space enabling visitors to more easily view the exhibit.

A pleasing general colour scheme prevailed, ivory white and shades of purple, relieved with maroon and gold, also light asparagus festooning between the columns, making the whole aspect of the Court artistic, bright, and cheerful.

POULTRY.

(Judges, Messrs. A. A. Roberts, W. Hindes, W. D. Dell, J. Hallett, and T. Fanning.)

Brahma, any colour, cock or cockerel: W. E. Smalley 1, W. Want 2. Hen or pullet: W. E. Smalley 1 and 2. Dorking, any colour, cock or cockerel, and hen or pullet: Mrs. W. E. Faulkner. Langshan, any colour, any variety, cock or cockerel: F. G. Barnett. Hen or pullet: W. E. Smalley 1, F. G. Barnett 2. Plymouth Rock, single comb, barred, cock: Geo. L. Brauer 1 and 2, J. Page 3. Hen: J. E. Hastings 1 and 2, Frank Stanfield 3. Cockerel: C. F. Branthwaite 1, W. J. Ewart 2, Frank Stanfield 3. Pullet: J. E. Hastings 1, W. J. Ewart 2, W. J. Trezise 3. White, cock: Geo. L. Brauer 1, W. H. Duffy 2, A. R. Hatcher 3. Hen: G. L. Brauer 1, James Pryde 2, W. H. Duffy 3. Cockerel: A. R. Hatcher 1, James Pryde 2. Pullet: W. H. Duffy 1 and 2. Wyandotte, silver-laced, cock: A. Christensen 1, C. W. Searl 2. Hen: W. C. Oxlade 1, A. A. Roberts 2, Jas. Munro, jun. 3. Cockerel: W. H. Wakefield 1, A. Christensen 2, S. D. Raff 3. Pullet: S. D. Raff 1 and 2, Jas. Munro, jun., 3. Gold-laced, hen, cockerel, and pullet: W. E. Smalley. White, cock: R. C. Doherty 1, A. F. Knowles 2. Hen: H. Dickson 1, R. C. Doherty 2, T. B. Barker 3. Cockerel: Jas. Munro, jun., 1, H. Dickson 2, F. M. Vogel 3. Pullet: Jas. Munro, jun., 1, H. Dickson 2. Any other colour, cock: A. Miller 1, T. B. Barker 2. Hen: A. Miller 1, C. D. Hooper 2. Cockerel: James Ferguson 1, A. Miller 2. Pullet: C. D. Hooper 1, James Ferguson 2. Orpington, black, cock: W. J. Ewart 1, Geo. Grace 2, Mrs. A. E. Gallagher 3. Hen: Geo. Grace 1 and champion, T. B. Barker 2, Mrs. A. E. Gallagher 3. Cockerel: W. and G. W. Hindes 1, 2, and 3. Pullet: Geo. Grace 1, C. W. Searl 2, John McCaffrey 3. Buff, cock: A. G. Bennet 1, C. W. Watts 2, McBean Bros. 3. Hen: A. G. Bennet 1, McBean Bros. 2, W. J. Taylor 3. Cockerel: W. J. Taylor 1, C. W. Watts 2, C. W. Searl 3. Pullet: W. J. Taylor 1, A. G. Bennet 2, C. W. Searl 3. Favorolle, any colour, cock or cockerel, and hen or pullet: F. W. Leney, Rhode Island, single comb, red, cock: Victor Brand 1, J. N. Fisher 2, Holmes Bros. 3. Hen: J. N. Fisher 1, Holmes Bros. 2, James Ferguson 3. Cockerel: James Ferguson 1, 2, and champion, Mrs. E. A. Thompson 3. Pullet: James Ferguson 1, J. N. Fisher 2, E. Moore 3. Any other variety, cock or cockerel, and hen or pullet: F. W. Leney. Sussex, any colour, cock: F. P. Wotton. Hen: J. Williams 1, F. P. Wotton 2. Cockerel and pullet: F. P. Wotton. Any other variety, cock or cockerel: Tom Clarke 1, W. B. McLaughlin 2. Hen or pullet: Tom Clarke 1 and 2. Leghorn, single comb, brown, cock: John Erskine 1 and 2. Hen: A. L. Stewart 1, F. Miller 2, A. L. Stewart 3. Cockerel: Tom Bird 1, F. Miller 2 and 3. Pullet: John Erskine 1, F. Miller 2. White, cock: Alfred Astill 1, R. R. Brown 2, J. Larcombe 3. Hen: R. R. Brown 1 and 2, R. Cooper 3, David Ness 4. Cockerel: R. R. Brown 1 and 2, J. Larcombe 3, Fred Batchelor 4. Pullet: Henry Basford 1, R. R. Brown 2, Fred Batchelor 3, R. R. Brown 4. Rose comb, brown, hen or pullet, and cock or cockerel: Mrs. Heath. Minorca, single comb, cock: P. N. Ingham 1, Jas. A. McRobert 2. Hen: T. J. Hughes 1 and champion, P. N. Ingham 2, J. Williams 3. Cockerel: R. C. Doherty 1, T. J. Hughes 2, O. Meakin 3. Pullet: T. J. Hughes 1, H. Leeper 2, Jas. A. McRobert 3. Andalusian, cock: F. P. Wotton 1, 2, and champion. Hen: F. P. Wotton 1 and 2. Cockerel: F. P. Wotton 1, A. Miller 2. Pullet: F. P. Wotton 1, A. J. McGrory 2. Black Spanish, hen or pullet: Mrs. R. Murray 1 and 2. Hamburg, gold or silver spangled, or pencilled, cock: J. E. Hastings 1, S. Williams 2. Hen: S. Williams 1, J. E. Hastings 2. Cockerel: J. E. Hastings 1 and champion. Any other colour, cock: W. J. Brauer. Hen: W. G. Shearer 1, W. J. Brauer 2. Cockerel: W. J. Brauer 1, D. Owens 2. Pullet: W. G. Shearer 1, W. J. Brauer 2. Sicilian buttereups, cocks: F. J. Will 1 and champion, Jas. T. Wiley

2. Hen: W. J. Schrey, 1 and 2. Cockerel: R. Gillespie 1, J. T. Wiley 2. Pullet: W. J. Schrey 1, R. Gillespie 2. Silver Campines, any colour, cock: Arch. C. Davies 1 and champion, Mrs. R. Murray 2. Cockerel: Mrs. R. Murray. Pullet: Arch. C. Davies 1, Mrs. R. Murray 2. Anconas, cock: Phil McGrory 1 and champion, T. E. Sleeman 2, H. Stephens 3. Hen: H. Stephens 1, John Docherty 2, Geo. Andrews 3. Cockerel: Phil McGrory 1, J. B. Thomson 2, H. Denby 3. Pullet: H. Stephens 1, Daniel Dalton 2, John Docherty 3.

Game Varieties.—Modern British, black-breasted, red, cock: W. Williams 1, F. Gerlee 2, W. T. Duthie 3. Hen: A. H. McConechy 1, Wilson and Smith 2, S. Webber 3. Cockerel: S. Webber 1, W. T. Duthie 2, C. H. Quince 3. Pullet: Henry Bashford 1, A. H. McConechy 2, Wilson and Smith 3. Pile, cock: W. T. Duthie 1 and 2. Hen: W. Williams 1 and 2. Cockerel: W. T. Duthie 1, 2, and 3. Pullet: W. Williams 1 and 2. Duckwing, cock: W. T. Duthie 1, Henry Bashford 2. Cockerel: A. H. McConechy 1 and champion, F. Gerlee 2 and 3. Hen: A. H. McConechy 1, Henry Bashford 2, Wilson and Smith 3. Pullet: E. B. Graham 1, W. Williams 2. Old English game, black-breasted, red, cock: H. A. Bostock 1, Hampson Bros. 2, W. H. Greasley 3. Hens: A. J. Larcock 1, A. A. Roberts 2, W. Latham 3. Wheaten or clay hen: Hampson Bros. 1, A. Priestly 2, A. Martin 3. Cockerel: A. J. Lurcock 1, W. Fox 2, A. Martin 3. Partridge, wheaten or clay, pullet: W. Latham 1, A. Priestly 2, A. Martin 3. Spangled or broken colour cock: Hampson Bros. 1, H. A. Bostock 2, E. M. Jones 3. Hen: W. H. Greasley 1, Hampson Bros. 2. Cockerel: H. A. Bostock 1, Wm. Fox 2, E. M. Jones 3. Pullet: H. A. Bostock 1, A. J. Lurcock 2, W. H. Greasley 3. Any other colour, cock: H. A. Bostock 1, A. J. Lurcock 2, E. M. Jones 3. Hen: A. J. Lurcock 1, H. A. Bostock 2. Cockerel: H. A. Bostock 1, Wm. Fox 2, Hampson Bros. 3. Pullet: H. A. Bostock 1, Hampson Bros. 2, Wm. Fox 3. Pit game, any colour, cock: Mrs. C. Donnelly 1 and champion, F. A. Green 2, James Page 3. Hen: D. J. Coogan 1, E. Walker 2, Jas. D. Wylie 3. Cockerel: F. A. Green 1, Joel Ashcroft 2 and 3. Pullet: D. J. Coogan 1, F. Tedman 2, E. Walker 3. Henfeather, cock: Watson and Brown 1, J. A. Poulton 2, Joel Ashcroft 3. Hen: Wilson and Smith 1, D. J. Coogan 2, W. D. Dell 3. Cockerel: G. Wilson 1, W. D. Dell 2, J. D. Stephens 3. Pullet: J. D. Stephens 1, W. D. Dell 2 and 3. Malay, cock and hen: S. Keith. Indian game, cock: A. J. McGrory 1, J. Gaydon 2, G. Grace 3. Hen: A. J. McGrory 1, J. W. Horrobin 2, S. Keith 3. Cockerel: J. W. Horrobin 1 and 3, J. Gaydon 2. Pullet: J. Gaydon 1, H. Stephens 2, J. Gambling 3. Australian game, cock: S. Keith. Hen: S. Keith 1, T. J. Mullen 2. Any other variety: T. J. Mullen.

Utility Classes.—Leghorn, cock or cockerel: M. Floyd 1, L. A. Peirce 2, F. W. Leney 3. Hen or pullet: M. Floyd 1 and 2, F. W. Leney 3. Any other light variety, hen or pullet: H. Stephens 1, J. Docherty 2 and 3. Orpington, cock or cockerel: J. J. Curley 1, John F. Beeston 2, F. W. Leney 3. Hen or pullet: Frank Lewis 1, J. J. Curley 2, R. Gillespie 3. Any other heavy variety, cock or cockerel: F. Keen 1, John F. Beeston 2, James Ferguson 3. Hen or pullet: John F. Beeston 1, F. W. Leney 2, James Ferguson 3.

Breeding Pen, male and two females.—Leghorns, single comb, white: Alfred Astill 1, J. A. Poulton 2, Alfred Astill 3. Brown: Tom Bird 1, John Erskine 2. Minorcas: P. N. Ingham 1, Alfred Astill 2, S. N. Wood 3. Anconas: Albert Bevis 1, G. A. Andrews 2, W. Hasper 3. Any other light variety: Mrs. R. Murray 1, F. P. Wotton 2, Albert Bevis 3. Plymouth Rocks: W. E. Smalley 1, J. E. Hastings 2, Mrs. R. Murray 3. Wyandottes, any other colour: Jas. Munro, jun. 1, C. D. Hooper 2. Orpington, black: W. Hughes 1, W. and G. W. Hindes 2, C. W. Searl 3. Any other variety: C. W. Searl 1, M'Bean Bros. 2, J. G. Higgletton 3. Rhode Island, any colour, any variety: Holmes Bros. 1, J. N. Fisher 2, E. White 3. Any other heavy variety: Mrs. R. Murray. Indian game: A. J. McGrory 1, John Gambling 2, J. W. Horrobin 3. Pit: E. Herrington 1, G. Mellfont 2, J. O'Brien 3. Old English: A. Martin 1, Hampson Bros. 2. Any other variety: R. H. Bryans 1, W. T. Duthie 2, A. J. Schmiegl 3.

Utility Pens.—White Leghorns: W. and G. W. Hindes 1, M. Floyd 2, R. H. Woodcock 3. Orpingtons: H. O. Jones 1, J. J. Curley 2. Rhode Island Reds: F. W. Leney 1, J. N. Fisher 2.

Table Poultry.—Dressed, 4½lb., and under: Mrs. R. Murray. Over 4½lb.: W. J. Trezise 1, Mrs. R. Murray 2, Mrs. A. Wyllie 3. Capons, light: J. Finnigan.

Bantams.—Modern game, any colour, cock: M. L. Davies 1, J. Rowan 2. Cockerel: W. Kyte 1, J. Rowan 2, M. L. Davies 3. Hen: J. Rowan 1, M. L. Davies 2. Pullet: M. L. Davies 1, W. Kyte 2, J. Rowan 3. Old English game, black, red, cock: H. Wotton 1, Geo. Mellifont 2, W. Want 3. Partridge, hen: Frank Stanfield 1, H. Wotton 2, J. Bailey 3. Wheaten or clay, hen: Frank Stanfield. Black red cockerel: F. Stanfield 1, J. Bailey 2, G. Mellifont 3. Partridge or wheaten, pullet: A. E. Simpson 1, J. Bailey 2, H. Wotton 3. Spangled or broken colour, cock: C. F. Branthwaite 1, A. Campbell 2, J. Rowan 3. Hen: J. Rowan 1, A. Campbell 2. Cockerel: W. Hughes 1, Mrs. O. Hopes 2, Mrs. R. Murray 3. Pullet: Mrs. R. Murray 1, J. Rowan 2. Duckwing, cock or cockerel: Mrs. R. Murray 1, M. L. Davies 2, W. Hughes 3. Hen or pullet: Mrs. R. Murray. Any other colour, cock: Frank Stanfield 1, Mrs. R. Murray 2. Hen: D. Parmenter 1, Frank Stanfield 2, Mrs. R. Murray 3. Rose comb, hen: A. Miller. Cockerel and pullet: A. Miller 1, M. L. Davies 2. Pekin, buff hen: J. Rowan 1, Mrs. R. Murray 2. Cockerel: A. Miller 1, J. Rowan 2. Pullet: J. Rowan 1, A. Miller 2. Black cock: J. Rowan 1 and 2. Hen: J. Rowan 1, M. L. Davies 2. Cockerel: J. Rowan 1, A. Miller 2. Pullet: J. Rowan 1, M. L. Davies 2. Any other colour, cock: M. L. Davies 1, J. Rowan 2. Hen: J. Rowan 1 and 2. Silkies, cock and hen: A. J. McGrory 1, J. Rowan 2. Cockerel: G. Mellifont 1, J. Rowan 2. Pullet: G. Mellifont 1, J. Rowan 2, A. J. McGrory 3. Siebrights, silver, cock: Phil McGrory 1, Mrs. R. Murray 2. Hen: Phil McGrory 1, A. Miller 2. Cockerel: A. Miller 1, J. Rowan 2. Pullet: A. Miller 1, M. L. Davies 2. Gold, hen or pullet: J. Rowan 1 and 2. Any other variety, 1, J. Rowan 2. Cockerel: Mrs. B. Murray. Pullet: Mrs. R. Murray 1, D. McDougall 2.

Breeding Pens.—Modern game, male and two females: J. Rowan 1, Mrs. R. Murray 2. Old English game, any colour: H. Wotton 1, Mrs. R. Murray 2. Pekins, any colour: R. Gillespie 1, J. Rowan 2, Mrs. R. Murray 3. Rose comb: Mrs. R. Murray. Silkies: J. Rowan 1, Mrs. R. Murray 2.

Ducks.—Rouen, drake: J. Rowan 1 and champion. Duck: J. Rowan 1 and champion. Muscovy, white, drake: C. C. Norton 1 and champion. Duck: C. C. Norton. Indian Runner, white, drake and duck: J. Rowan. Any other colour, drake: J. Soden, jun., 1 and champion, R. W. Robertson 2. Duck: J. Soden, jun. 1, R. W. Robertson 2. Indian Runner, young drake and duck, under 12 months: J. Soden, jun. Any other variety, drake and duck: J. Rowan.

Breeding Pens.—Indian Runner: J. Soden, jun. Muscovy, white: Chas: T. Woods 1, C. C. Norton 2. Any other colour: A. Dobson. Any other variety: J. Rowan.

Geese.—Toulouse or Emden, goose or gander: Mrs. R. Murray. Any other variety: A. E. Simpson 1 and 2.

Turkeys.—Bronzewing, cock and hen: Doyle and Charles. Breeding pen: Mrs. C. A. Mooreland.

Guinea Fowls.—Cock and hen: J. Rowan 1, A. E. Simpson 2.

Miscellaneous.—Guinea pig, buck or doe: J. Rowan.

LIST OF CHAMPIONS.

Light variety, male: Phil McGrory. Female: A. L. Stewart. Pit game: Mrs. C. Donnelly. Minorca: T. J. Hughes. Pekin, male: J. Rowan. Female: James Ferguson. Siebrights: A. Miller. Old English game, bantam: J. Rowan. Duckwing, male: A. H. McConchy. Female: W. H. Greasley. Spangled or broken colour, male: Hampson Bros. Female: W. H. Greasley. Australian game: S. Keith. Modern game: bantam, M. L. Davies. Indian game: A. J. McGrory. Henfeather: Watson and Brown. Malay: S. Keith. Champion male bird of show: J. Rowan.

JUVENILE CORN-GROWING COMPETITION.

It has been decided by the Department of Agriculture to hold another Juvenile Corn-growing Competition for 1920-21, which will be open to boys and girls who are under 18 years of age on the date of application being made.

Applications must be submitted to the Under Secretary, Department of Agriculture and Stock, Brisbane, not later than 9th October, this year, and be accompanied by an entrance fee of 2s. 6d. Particulars should be sent at the same time of the following:—

- (a) Full name and address, with christian names in full.
- (b) Date of birth (day, month, and year).
- (c) Name of dairy inspector who supervises the particular locality in which the applicant resides.

Three special prizes, to the value of £10, £5, and £3 respectively, will be awarded for first, second, and third prizes in the competition.

District prizes of £5, £2, and £1 will be given as district prizes under certain conditions, viz.:—

If there are less than six competitors the prizes will be allowed as follow:—

Four to five competitors (inclusive), two prizes—first and second;

Two to three competitors (inclusive), one prize only—first;

When only one competitor, he or she will be debarred from participating in the district prize, but will be eligible to compete for the special prizes.

It will thus be seen that it is in the interests of the competitors to encourage others to enter for the competition.

No money prizes will be given, but each successful competitor will be allowed to select some article to the value of his or her prize.

No prize will be awarded unless the yield of corn equals 20 bushels per acre, but this stipulation may be waived under very exceptional circumstances in the case of a lower yield.

GRAIN FOR SALE.

SEED MAIZE.

To growers desirous of obtaining supplies of pure and reliable strains of improved seed, the following varieties are being offered and represent limited stocks raised from selected strains of Departmental seed:—

Yellow.—Improved Yellow Dent and Hiawatha Yellow Dent.

White.—Boone County White.

CONDITIONS OF SALE.

Applications for seed, with accompanying remittance (exchange added) should be addressed to the Under Secretary for Agriculture, Brisbane. (*Postal address and name of railway station should be given.*) It will be taken for granted (unless otherwise specified) that a similar type and kind of grain to the one ordered can be sent as a substitute. This provision applies only in cases where orders exceed the available supply of any one variety of seed (yellow).

Advice will be sent when seed is despatched.

Purchasers are requested to write promptly after receipt of seed should any matters require adjustment.

PRICES.

To enable applicants living at a distance to benefit, a flat rate of 15s. per bushel is being charged. This price includes all railage to the nearest railway station, but where steamer freight is necessary this and any charges in relation thereto must be paid by the purchaser, who must

furnish instructions concerning shipping arrangements and the name of agent to whom the grain is to be consigned.

Fifteen shillings (15s.) per bushel.

DESCRIPTION OF THE ABOVEMENTIONED VARIETIES OF SEED MAIZE FOR SALE.

Improved Yellow Dent.—This is perhaps one of the best known and most extensively grown varieties in this State. Numerous strains are met with in nearly all districts, all more or less emanating from the original "Yellow Dent." This variety has for many seasons undergone considerable improvement, and a type suitable to meet many of the State's requirements is now being offered. "Improved Yellow Dent" may be classed as a medium-late maturing variety, from five to five and a-half months, a strong, prolific grower, from 10 feet to 12 feet high, capable of giving large returns both of grain and fodder. The ears are of medium size, 8 inches to 10 inches, stout, cylindrically shaped, borne somewhat high on the stalk, semi-erect in habit, being well protected by a strong, tight, close-fitting husk; they are usually well filled, carrying from 16 to 18 rows of grain packed on the cob. The grain is of a rich amber colour, with a yellow tip cap; of medium hardness, and of a deep, flattened wedge-shaped appearance. The core is usually of a pink colour. This variety adapts itself readily to varying conditions, and has given splendid returns in many of the maize-growing districts.

Boone County White.—This is one of the heaviest yielding white varieties grown, and one that readily adapts itself to new conditions. A medium season variety, somewhat earlier than most maize of this type, taking from four to four and a-half months to mature. A fairly prolific bearer and a consistent yielder. The ears are exceptionally large, from 10 inches to 12 inches, and of large circumference, cylindrical in shape, carrying from 16 to 20 rows of tightly packed grain; being pendulous in habit, it is inducive to early ripening. The grain is of medium size, solid block wedge-shaped type of a hard, horny texture, with a light starchy tip leaving a slightly rough dent. This variety has undergone considerable improvement, proven by the consistent yields obtained, and is recommended for areas contiguous to the coast.

Hiawatha Yellow Dent.—The original seed of this maize was imported by the Agricultural Department in 1913. The History of the variety credits it as originating in Illinois, U.S.A., over thirty years ago, when it was known as "Mammoth Yellow Dent" and samples then exhibited were awarded a 500 dollar premium. A Mr. Ziller, of Hiawatha, Kansas, crossed it with a quicker maturing standard variety, "Legal Tender," paying attention in the selection to well developed ears with a deep kernel. This breeder's work proved successful, as he secured the premium for the best ten ears of yellow corn at the Kansas State Corn Show.

Hiawatha Yellow Dent is a strong grower and takes about five months to mature. Under favourable conditions, two large, fairly uniform ears are generally produced by each stalk; these are borne on a long shank. The ears are well covered with "husk" and turn down as they approach maturity. This characteristic protects the grain from insect attack and from damage by excessive rains.

Ears are large with a robust core, red in colour, and the rows of grain, usually 20 in number, are set fairly close on the cob. The grain is of medium size, wedge-shaped, and of fair depth. It is of medium hardness with an inclination to roughness on the crown.

DO HORNS TELL AGE?

Most people "read" the rings of the horns incorrectly. At about two years of age, a small ring appears at the base of the horn, and another at three years. Then these two preliminary rings fuse and almost disappear; but a deep ring soon forms, and indicates the fourth year. To correctly judge the age from the horns, one should count the smooth tip and the first slightly marked ring as representing three years, and add one year for each additional ring. In the aged animal there is a marked depression or lessening in circumference at the base of the horn, which, together with the loss of the broad parts of the incisors or great wear of these teeth, may be accounted unmistakable evidence of advanced age.—"Breder's Gazette."

Pastoral.

BREEDERS OF PUREBRED STOCK IN QUEENSLAND—BEEF AND DAIRY CATTLE.

The Office of the Secretary of the undermentioned Herd Book Societies is 303 Queen street, Brisbane:—

- The Australian Hereford Herd Book;
- The Shorthorn Herd Book of Queensland;
- The Jersey Herd Book of Queensland;
- The Illawarra Herd Book of Queensland;
- The Ayrshire Herd Book of Queensland;
- The Milking Shorthorn Herd Book of Queensland;
- The Holstein-Friesian Herd Book of Australia.

NOTE.—Animals registered in the Commonwealth Standard Herd Book are not necessarily eligible for entry in the Jersey Herd Book of Queensland.

Name of Owner.	Address.	Number of Males.	Number of Females.	Herd Book.
DAIRY BREEDS.				
AYRSHIRES.				
W. C. Smith	The Haven, Goomeri	1	7	Ayrshire Society of Queensland
L. H. Paten	"Jeyendel," Calvert, S. & W. Line	8	21	Ayrshire Herd Book of Queensland
J. H. Paten	Gwandalan, Yandina	6	21	Do.
Queensland Agricultural College	Gatton	4	10	Do.
State Farm	Warren	3	83	Do.
J. W. Paten	Ayrshire Park, Wanora, Ipswich	10	42	Do.
J. H. Fairfax	Marinya, Cambooya	9	55	Do.
J. Holmes	"Longlands," Pittsworth	6	20	Do.
H. M. Hart	Glen Heath, Yalangur	7	21	Do.
F. A. Stimpson	Ayrshire Stud, Fairfield, South Brisbane	7	77	Do.
M. L. Cochrane	Paringa Farm, near Cairns	5	21	Do.
John Anderson	"Fairview," Southbrook	7	34	Do.
JERSEYS.				
T. Mullen	"Norwood," Chelmer	3	20	Jersey Herd Book of Queensland
Queensland Agricultural College	Gatton	2	31	Do.
M. W. Doyle	"Oaklands," Moggill	4	12	Do.
G. A. Buss	Bundaberg	1	15	Do.
R. Conochie	Brooklands, Tingoorra	9	21	Do.
W. J. Barnes	Millstream Jersey Herd, Cedar Grove	10	37	Do.
W. J. Affleck	Grasmere, N. Pine ..	6	31	Do.
J. N. Waugh and Son	Prairie Lawn, Nobby	3	28	Do.
W. J. H. Austin	Hadleigh Jersey Herd, Boonah	2	11	Do.
State Farm, Kairi	Kairi, <i>via</i> Cairns ..	4	16	Do.
H. D. B. Cox	Sydney (entered in brother's name)	3	16	Commonwealth Standard Jersey Herd Book
GUERNSEYS.				
Queensland Agricultural College	Gatton	2	2	Eligible, but no branch of the Guernsey Herd Book Society of Australia in Queensland

BREEDERS OF PUREBRED STOCK IN QUEENSLAND—*continued.*

Name of Owner.	Address.	Number of Males.	Number of Females.	Herd Book.
DAIRY BREEDS— <i>continued.</i>				
HOLSTEINS.				
Queensland Agricultural College	Gatton	2	9	Holstein-Friesian Herd Book of Australia
George Newman ..	"St. Athan," Wyreema	9	92	Do.
F. G. C. Gratton ..	"Fowlerton," Kings-thorpe	1	15	Do.
R. S. Alexander ..	Glenlomond Farm, Coolumboola	1	3	Do.
Ditto	Ditto	1	..	Holstein-Friesian Herd Book of New Zealand
S. H. Hoskings ..	St. Gwithian, Toogooloowah	..	..	Holstein-Friesian Herd Book of Australia
C. Behrendorff ..	Inavale Stud Farm, Bunjgurgan, Q.	3	9	Do.
E. Swayne	West Plane Creek, Mackay	1	2	Do.
ILLAWARRA.				
A. Pickels	Blacklands Stud, Wondai	4	62	Illawarra Herd Book of Queensland
J. T. Perrett and Son	Corndale, Coolabunia	3	43	Do.
W. T. Savage	Ramsay	2	22	Do.
Hunt Bros.	Springdale, Maleny..	3	62	Do.
MILKING SHORTHORNS.				
P. Young	Talgai West, Ellinthorp	2	42	Milking Shorthorn Herd Book of Queensland
W. Rudd	Christmas Creek, Beaudesert	2	10	Do.
A. Rodgers	Torran's Vale, Lane-field	1	9	Do.
W. Middleton ..	Devon Court, Crow's Nest	3	27	Do.
A. K. Yorksten ..	"Dunure," Miles ..	2	8	Do.
W. H. Francis ..	"Exelawn," Colinton, Brisbane Valley Line	3	5	Do.
BEEF BREEDS.				
SHORTHORNS.				
T. B. Murray-Prior ..	Maroon, Boonah ..	2	37	Queensland Shorthorn and Australian Herd Books
C. E. McDougall ..	Lyndhurst Stud, Warwick (2)	25	100	Queensland Shorthorn Herd Book
Godfrey Morgan ..	"Arubial," Condamine	3	6	Do.
W. B. Slade	E. Glengallan, Warwick	2	20	Do.
HEREFORD.				
A. J. McConnell ..	Dugandan, Boonah	19	36	Australian Hereford Herd Book
E. M. Lumley Hill ..	Bellevue House, Bellevue	45	127	Do.
Tindal and Son ..	Gunyan, Inglewood	50	400	Do.
SUSSEX.				
James T. Turner ..	The Holmwood, Neurum	2	4	Sussex Herd Book of England

Dairying.

DUTCH OR FRIESIAN CATTLE.

In his excellent work, "Dairying in All Its Branches," Mr. M. A. O'Callaghan discusses the merits of the Dutch or Friesian cattle, as follows:—

"Holland has long been noted both for its cattle and cheese. The people of this State are intimate enough with the latter, but only in very few districts is the Dutch race of cattle known in its purity, although it is stated by some that there is a cross of what is called the Holstein in our Illawarra cattle. Holsteins is the common name given by all English-speaking people to Dutch cattle, no matter what part of the Netherlands they come from, although, strictly speaking, this title is an incorrect one, the cattle of other parts of Holland being longer and better known to history as excellent yielders of milk; and it must be remembered that Holstein was but a part of the Netherlands, and it is quite certain that the cattle of this province did not dominate the rest of the country. However, within late years, interchange of cattle for breeding between all parts of Holland has been going on, so that now we might look upon all the lowland races of Dutch cattle as similar, being alike in general characteristics and in dairy qualities. Holstein or Friesian cattle are in great favour in Germany and America, and I am surprised that they are not better known in New Zealand, as they are undoubtedly great cheese-producing cattle. They must, however, have deep rich pastures to graze on, and no greater folly could be permitted than to adopt this breed in our inland country where drouthy conditions are frequent, or on light, or even medium coast country. Anyone who has ever seen the rich flat fields of Holland, with grass and water in abundance, would at once recognise that a race of cattle generated for over 2,000 years on such a country would be suitable only for our richest coast country, or for our deep river flats. The following are the measurements of one of the imported Dutch cows:—Height at shoulder, 56 in.; length from top of shoulder to the pin-bone, 66 in.; girth behind the shoulder, 84 in.; breadth across the hips, 26 in. This cow is in fair milking condition, and people conversant with cattle will recognise at once that these measurements represent a very big frame, and one that requires plenty of succulent food in order to maintain it in proper condition, and at the same time enable the cow to yield 4 or 5 gallons of milk per day for some months.

"The characteristics of good present-day Holstein or Friesian cows are large angular frames, great depth from the top of the shoulder to the dewlap, very big and roomy behind, with great udder space, big barrel, large udders, good-sized teats, and very big knotty milk veins running well forward. In colour they are black and white, either ridged or mottled with these colours, though the black with belts or ridges of white look the handsomer, and the legs just above the hoofs are almost always white. The hair is smooth and short, and the skin is soft and pliable. The head is rather narrow, the face is generally long, though a shorter and dished face is met with, especially in cattle from South Holland, which are scarcely as large as those of North Holland. The horns are short, fine, and crumpled, or turned in somewhat, like those of the Jersey, the colour of the horn being white, tipped with black. A section of the breed met with in Germany is entirely black, and there are also the brown (or lemon) and white-coloured specimens. The milk yielded is very white in colour, and, generally speaking, rather poor in fat, though I am confident this latter point could be greatly improved on with selection and breeding; but Holland is a cheese country, and the farmers there pay much more attention to the amount of milk yielded than to its richness in fat. As a race, perhaps, Holsteins are, under favourable conditions, the largest yielders of milk in the bovine world. Dr. Veith, Director of the Dairy Institute, Hameln, whom I know to be a reliable worker, recently completed some records for a herd of Holstein-Friesian cattle. Records are given of twenty-seven animals for a period of twelve months, this period sometimes including a portion of the milk of two calvings, especially in cases where cows were advanced in milk when the trials began. The cows were milked three times a day for a time after calving, the milk was recorded, and the butter-fat estimated twenty-six times in the year, and the averages taken. The richest average fat test was 4.26 per cent., this cow being 8 years old when the test began, and her milk yield was about 1,300 gallons, and she was in milk for the twelve months. The lowest average fat test was 2.92 per cent., this cow yielding 1,760 gallons in the twelve months. This represents ten months of one milking and two of another. The greatest amount of milk yielded was 1,980 gallons, the fat test of this cow averaging 3.16 per cent.

The Horse.

PREVENTION OF CORNS IN HORSES.

The following notes on this important subject in "The Rider and Driver" (New York) were republished in "The Live Stock Journal" of 21st May, 1920:—

"It is a prevalent belief that bruises cause corns. If this be so, it seems strange that 90 per cent. of horses affected with corns develop them in the same location of each foot. Surely a bruise could not be expected to hit the same place nine times out of ten. And horses whose feet are leathered, many of which have corns, surely do not get them from bruises. A corn is almost invariably seen on the inside quarter of the sole of the fore foot, between the bar and the wall. I am well convinced that a corn can be caused by a bruise, particularly in the case of a horse with a flat, thin-soled foot. But the reason for corns appearing regularly in the same place upon horses' feet should be fairly good evidence that causes other than bruises are mostly responsible for their appearance. Just why a corn should appear between the bar and the wall on the inner quarter is indeed worthy of consideration.

"Unless the shoer stands directly under the chest of the horse, he has to pull the foot eight or ten inches out of its natural perpendicular position. In paring the foot it is very easy to trim down the inner heel lower than the outer one, because when the foot is out of its natural perpendicular position it will not look level unless the inner heel is lower than the outer one. A good shoer will always measure the height of the inner and outer heel to make sure that the foot is level. Unless the shoe is level, the outer quarter comes in contact with the ground and receives the weight of the load before the inner quarter.

"This causes an uneven strain on the delicate tissues within the hoof, and in time causes the wall to warp away from the sensitive wall or lamina within the outer wall. Lameness, of course, follows.

"When the shoe is removed, a red area, termed a 'corn' may be noticed between the inner bar and the wall of the foot. When pressure is applied to this area it will be found that the spot is very sensitive. If the foot is levelled up and the horse allowed to rest until the congestion caused by the previous uneven shoeing has subsided, the sensitive tissue which has been injured will usually recover its normal condition without any attendant complications. Frequently the poor horse does not have the good fortune to receive this treatment, and an all-knowing know-nothing usually pares down the blood-stained area, which removes the support of the surrounding healthy tissue to the injured part and automatically removes the possibility of recovery in a few days to a few weeks.

"The next step by those who know but little of anatomy is usually the application of a bran or meal poultice, which supplies the exact conditions—namely, heat and moisture—requisite for the development of bacteria. If the poultice is kept on long enough suppuration begins, of course, and eats its way through the sensitive tissue lying next to the wall, until broken-down tissues form a protruding bunch above the coronary band.

"At this stage the poor animal is said to have 'gravel.' After suppuration has further advanced and Nature has perhaps developed a running sore, or outlet, to relieve the suffering tissues within the foot, the disease is called a 'quitter.'

"If fate accords the unhappy animal the good fortune to have a friend who will suggest to the owner that he have a veterinarian, the first step towards effecting recovery from the little corn from which it started will be undertaken. The animal will be put under complete anaesthesia in a hospital, the diseased tissue and the lateral cartilage will be removed, and in six or seven weeks, after enduring considerable pain, which naturally accompanies this affliction, the horse will recover.

"Horseowners and horse-lovers will spare their willing slave and faithful helper, the horse, much pain and suffering if they will see that the blacksmith levels the foot by having the outer and inner heel the same height, because it is unlevel shoeing and the irritation which follows the uneven paring of the outer and inner wall of the foot which causes corns in nearly every instance."

Poultry.

REPORT ON EGG-LAYING COMPETITION, QUEENSLAND AGRICULTURAL COLLEGE, JULY, 1920.

All the birds are now in good laying stride and took little notice of the rain that fell during the latter part of the month. So far, broodiness has given very little trouble. The highest score for six birds for the month was achieved by a group pen—Mr. Lawson's White Leghorns, with 141 eggs, and Mr. J. E. Smith's Black Orpingtons, with 153 eggs. Mr. E. F. Dennis's "E" bird laid 30 eggs in 31 days; W. Smith's "F" hen laid 30 eggs in 31 days: both Black Orpingtons; J. E. Ferguson's "E" hen (Chinese Langshan) laid 28 eggs for the month; while Haden Poultry Farm's "A," Dr. Jennings's "F," and L. G. Innes's "C" each laid 26 eggs for the month, these being the highest totals for the month by single tested White Leghorns. There was one death during July, viz.:—E. F. Dennis's "C" hen, the cause of death being tuberculosis. Three birds received treatment for various ailments, but on the whole the health of the competitors has been excellent. The following are the individual scores:—

Competitors.	Breed.	July.	Total.
LIGHT BREEDS.			
*O. W. J. Whitman	White Leghorns ...	133	471
*G. Trapp	Do.	129	468
*Haden Poultry Farm	Do.	132	465
Geo. Lawson	Do.	141	456
*S. McPherson	Do.	136	450
*J. J. Davies	Do.	132	443
*J. Newton	Do.	121	434
*W. Becker	Do.	123	429
*Quinn's Post Poultry Farm	Do.	135	424
*T. Fanning	Do.	123	419
*J. M. Manson	Do.	123	413
*J. H. Jones	Do.	114	408
*W. and G. W. Hindes	Do.	125	402
*G. Williams	Do.	115	400
*Dr. E. C. Jennings	Do.	134	400
*H. Fraser	Do.	116	397
S. L. Grenier	Do.	133	389
*E. A. Smith	Do.	115	384
*S. W. Rooney	Do.	123	380
*Range Poultry Farm	Do.	123	378
Thos. Eyre	Do.	128	369
*L. G. Innes	Do.	136	361
*Mrs. L. F. Anderson	Do.	125	358
W. Morrissey	Do.	128	355
*N. A. Singer	Do.	128	351
*Mrs. L. Henderson	Do.	105	350
*B. Chester	Do.	111	350
A. J. Anderson	Do.	93	349
Mrs. R. Hodge	Do.	130	338
*Thos. Taylor	Do.	104	336
Miss E. M. Ellis	Do.	134	327
C. M. Pickering	Do.	105	324
E. Chester	Do.	107	319
C. Langsbecker	Do.	117	318

EGG-LAYING COMPETITION—continued.

Competitors.	Breed.	July.	Total.
LIGHT BREEDS—continued.			
Avondale Poultry Farm	White Leghorns	113	315
H. P. Clarke	Do.	121	312
R. C. J. Turner	Do.	117	306
C. H. Towers	Do.	108	293
S. Chapman	Do.	118	267
W. D. Evans	Do.	93	239
H. A. Mason	Do.	92	220
C. A. Goos	Do.	78	203
HEAVY BREEDS.			
*R. Holmes	Black Orpingtons	138	513
*D. Fulton	Do.	140	499
*E. F. Dennis	Do.	144	455
*R. Burns	Do.	135	450
*E. Morris	Do.	136	435
*A. E. Walters	Do.	106	427
H. M. Chaille	Do.	117	425
*W. Smith	Do.	128	417
*A. Shanks	Do.	138	410
*A. Gaydon	Do.	147	410
*T. Hindley	Do.	118	400
*E. Oakes	Do.	144	389
J. E. Smith	Do.	153	370
*Nobby Poultry Farm	Do.	84	353
*R. B. Sparrow	Do.	101	346
Parisian Poultry Farm	Do.	129	337
R. C. Cole	Do.	122	335
G. Muir	Do.	113	330
Mrs. G. H. Kettle... ..	Do.	127	325
*J. E. Ferguson	Chinese Langshans	103	315
*E. Stephenson	Black Orpingtons	112	312
*J. Cornwell	Do.	136	307
G. Flugge	Do.	67	165
Total ... ..	...	7,855	24,095

* Indicates that the pen is being single tested.

RESULTS OF SINGLE TEST PENS.

Competitors.	A.	B.	C.	D.	E.	F.	Total.
LIGHT BREEDS.							
O. W. J. Whitman	76	71	84	73	82	85	471
G. Trapp	84	71	83	78	83	69	468
Haden Poultry Farm	91	62	90	82	68	72	465
S. McPherson	78	73	77	74	83	65	450
J. J. Davies	76	73	71	89	65	69	443
J. Newton	91	66	76	51	69	81	434
W. Becker	75	77	81	66	53	77	429
Quinn's Post Poultry Farm	83	78	79	69	55	60	424
T. Fanning	29	77	69	79	81	84	419
J. M. Manson	74	70	83	64	52	70	413
J. H. Jones	70	71	75	75	78	39	408
W. and G. W. Hindes	75	70	51	75	57	74	402

RESULTS OF SINGLE TEST PENS—*continued.*

Competitors.	A.	B.	C.	D.	E.	F.	Total.
LIGHT BREEDS— <i>continued.</i>							
G. Williams	64	69	68	67	78	54	400
Dr. E. C. Jennings	64	79	57	61	62	77	400
H. Fraser	62	53	73	72	74	63	397
E. A. Smith	62	59	73	63	69	58	384
S. W. Rooney	49	43	81	67	66	74	380
Range Poultry Farm	57	60	65	80	52	64	378
L. G. Innes	30	54	81	58	81	57	361
Mrs L. F. Anderson	79	68	75	49	45	42	358
N. A. Singer	58	55	63	77	40	48	351
Mrs. L. Henderson	40	56	64	58	77	55	350
B. Chester	63	37	62	67	63	58	350
Thos. Taylor	76	64	34	59	48	55	336
HEAVY BREEDS.							
R. Holmes	87	86	80	85	86	89	513
D. Fulton	89	88	74	68	77	103	499
E. F. Dennis	70	57	91	72	71	94	455
R. Burns	74	51	89	67	93	76	450
E. Morris	74	78	83	55	64	81	435
A. E. Walters	63	76	54	87	62	85	427
W. Smith	67	89	75	83	52	51	417
A. Shanks	45	59	75	90	42	99	410
A. Gaydon	68	93	64	43	53	89	410
T. Hindley	69	85	70	85	38	53	400
E. Oakes	59	74	85	35	73	63	389
Nobby Poultry Farm	57	93	47	93	43	20	353
R. B. Sparrow	73	3	78	78	42	72	346
J. E. Ferguson	26	60	45	58	80	46	315
E. Stephenson	84	52	36	65	41	34	312
J. Cornwell	52	84	50	20	40	61	307

CUTHBERT POTTS,
Principal.

FINAL REPORT OF THE SIXTEENTH EGG-LAYING COMPETITION,
QUEENSLAND AGRICULTURAL COLLEGE.

The sixteenth egg-laying competition at the Queensland Agricultural College was concluded on 29th March, 1920. Only birds whose records were considered to approach previous world's records, or which were close to one another for positions in the prize list, were retained until the expiration of the full 365 days—viz., until 2nd April. The closing of the competition on the above-mentioned date was due to the Easter holidays and the railway offices being closed, making it impossible to despatch the birds.

WEATHER CONDITIONS.

Another droughty year made it extremely hard for the birds. The thermometer registered as high as 109 deg. in the shade, and a shade temperature for a week at a stretch in close proximity to 100 deg. was no uncommon event. It was very fortunate that greenstuff could be procured, for, without that necessary commodity, the splendid scores and averages could not have been attained.

FEEDING.

No alteration from former tests was made in the composition of the morning mash—viz., 60 per cent. pollard, 30 per cent. bran, 5 per cent. Meggitt's meal, and 3 per cent. to 7 per cent. dried blood. Judgment was used as to the increasing or decreasing any of these ingredients, but the above formula can be taken as the average. For instance, linseed meal was lowered during hot weather and increased

during bleak weather. Five per cent. dried blood was about the average quantity given during the greater part of the test, an increase of about 2 per cent. being made about December, when signs of tiring were noticed. For grain feed, wheat and cracked corn were the cereals used, oats being unprocurable. Although the quality of the foodstuffs was not so good as it should have been, the birds fared a good deal better than the general run of poultry in the State, as pollard and bran were always available, and the poor samples of wheatmeal so commonly used by poultry-breeders were not requisitioned by the College. Fresh greenstuff was available during nearly the whole of the twelve months.

GENERAL RESULTS.

The results have been highly satisfactory, for it must be taken into consideration that the birds were labouring under very adverse conditions. The contest for premier position has been very interesting, quite a number of single birds and pens being in a heap for the coveted places at the head of the score, and with magnificent records.

OBSERVATIONS.

Several proofs have been gained from this test.

1. It has often been remarked that the water system at the College was unfair to the birds. Being running water in a trough exposed to the sun, it has frequently been stated that, by the time it reached the lower birds, it would be tainted and hot, and thus detrimental to their health. T. Fanning's pen is last on the first row; J. M. Manson's, second from last on the second row; R. Burns's, second from last on the third row. R. B. Sparrow's heavy breed group was last on the group row, and it was in the last six months, during the hot weather, that this pen made its great run up the list from near the bottom. Not one of these competitors had to replace birds, and their health throughout was excellent.

2. A pen of birds that fret at the commencement of the test and lose their appetites seldom do well in the competition. The pens in front are those from which no food has to be picked up after feeding. They always require a little extra feed right from the beginning. Those birds that fret at the commencement do likewise when encountering the bad weather. It appears in a number of cases that the conditions at the College are vastly different from what the birds are accustomed to and what they have been brought up to. We can often imagine an intending competitor closing his birds in when indifferent weather crops up, and toning up with various condiments. In fact, fussing with the six birds he intends to send to the test more than he does with the rest of his flock. This is quite wrong, for birds so treated must inevitably suffer when placed in the competition where normal outside conditions prevail. One of the main objects of the College tests is to prove stamina as well as production, so that when successful competitors are called on to supply the public they will supply birds which will give a good account of themselves under ordinary conditions of housing and treatment. There are cases of hard luck where a competitor takes a lower position than he would have done had it not been for some unforeseen trouble. Such little things, as they appear at first, often become serious as time goes on. A bird getting a slight chill travelling to the College, or a slight internal trouble occurring during transit, often finishes up in death.

3. Sending birds to the competition when in lay has its advantages *if the birds have been reared under healthy conditions and possess stamina*. It is the birds that have been confined too much that make a moult on their arrival at the College when they encounter changed conditions. Many are under the impression that the best birds to send are those almost on the point of laying. During this last test it was noticeable that quite a number of this class hung fire, and certainly did not lay when their respective owners reckoned on their doing so. Provided the birds are strong, and that they have not been pampered, those in lay on arrival usually give the best results, especially as every care is given to encourage appetites, and the characters of the birds are studied to a marked degree. The characters of the birds, in our opinion, are not sufficiently studied by intending competitors. Fowls, like humans, have different temperaments and at times take understanding. There are pens that arrive that are really sulky; others are of a very timid nature. Another mistake that is often made is the sending of birds in too high a condition; these at times go off their food, which sometimes means a false moult.

HEALTH OF BIRDS.

There were twenty-two deaths, and two birds were destroyed, making twenty-four replacements during the year. There were seven cases of ovarian disorder, two cases of inflammation of the bowels, one case of appendicitis and ulcerated bowels, one case of ruptured liver, five cases of tuberculosis, one case of broken blood vessel, and five cases of heat apoplexy. The two birds destroyed were affected with paralysis. Fourteen birds were removed from their pens for treatment of various disorders for periods from two to twelve days.

BROODIES.

Broodiness gave considerable trouble, and this materially spoiled the chances of a number of pens. The pens owned by the following breeders were very free from broodiness:—R. Burns, R. B. Sparrow, R. Holmes, E. Morris, and G. Nutt. In the light section, as many as three birds belonging to one competitor were broody, whilst a fair number had one or two birds which gave trouble in this direction. Broodiness in the light section is disastrous to a competitor's chance of occupying a premier position.

RECORDS.

Although the highest score for a single bird was 335 eggs by Mr. R. Burns's "D" Black Orpington, it is to be regretted that this bird, as with his previous 335-egg hen in the 1917-18 test, produced an egg under the 2 oz. standard. The laying of 1,619 eggs by six hens owned by Mr. R. Holmes constitutes a record by Black Orpingtons for this State. It was unfortunate that Mr. T. Fanning's pen of White Leghorns should have laid eggs under the standard, for, with the fine score of 1,627 for six birds, they closely approached the existing Queensland record of 1,661, held by E. Chester. What probably is a World's record is the laying by one of the Kelvin Poultry Farm's Barred Rocks; this bird produced 290 eggs over the standard weight of 2 oz. One of the finest things to record is the equality between the six birds sent by the leading competitors. This equality speaks well for the breeders concerned. One phenomenal layer amongst indifferent layers is not a sign of a good strain. Equality in production is what is looked for.

AVERAGES.

240 White Leghorns averaged	..	..	205.5 eggs per hen.
6 Anconas averaged	..	..	162.5 eggs per hen.
132 Black Orpingtons averaged	..	..	206 eggs per hen.
6 Rhode Island Reds averaged	..	..	166.8 eggs per hen.
12 Chinese Langshans averaged	..	..	196.2 eggs per hen.
6 Plymouth Rocks averaged	..	..	218.2 eggs per hen.

TRUENESS TO TYPE.

For the *True to Type Prize* the following conditions were observed:—

1. It has to be recognised that birds are entered into the competition for test as to fecundity, with the ultimate object of using them as breeders. Hence all their characteristics have to be considered in the light of their possible transmission to the progeny.

2. To be true to type the birds must not possess any but breed characteristics. For example, side spikes in single combs, or feathered legs in clean-legged varieties, &c., would be disqualifications. At the same time, any exaggeration of features, such as too large a comb in White Leghorns, would count against the bird just as much as a comb that was too small and erect. In the same way, medium values are required in many of the features, for it is fully recognised that the birds are for utility, not show purposes.

3. Because the birds are to be used for breeding, stamina is considered of vital importance, hence it has been deemed necessary to score the birds for stamina independently of type and conformation. In judging for stamina the general habits of the birds during four to six months' observation are utilised.

4. Each bird is judged separately and the group of six birds finally classified as the aggregate of the six individuals. In this way a measure of the uniformity of the breeding is given.

5. For the type of the various breeds the standards of the Poultry Club of England have been taken as a basis, with the following modifications:—Exaggeration of points is not allowed: the general conformation of the body has to comply with that essential wedge shape which is characteristic of the good layer.

The Scale of Points adopted is as follows:—

No. 1.—*Type and Conformation*—

Head—

Comb	..	..	..	..	..	..	10 points
Skull	..	..	..	..	..	..	5 points
Ear lobe	..	..	..	..	..	..	5 points
Face	..	..	..	..	..	..	5 points

— 25 points

Body	..	..	..	..	..	..	30 points
Size	..	..	..	..	..	..	25 points
Legs	..	..	..	..	..	..	10 points
Colour of plumage	..	..	..	..	..	..	10 points

Total 100 points

No. 2.—*Stamina*—

Eye	..	..	..	..	..	..	..	..	15 points
Head	..	..	..	..	..	..	..	..	20 points
Legs	..	..	..	..	..	..	..	..	15 points
Heart and lung room	..	..	..	..	..	..	..	..	15 points
Digestive capacity	..	..	..	..	..	..	..	..	15 points
Observation of general health and habits	..	..	..	..	..	..	..	..	20 points
Total	..	..	..	..	..	..	..	..	100 points

Disqualifications.—Showing alien blood. Inheritable characters, such as side spikes, feathering on shanks of clean-legged varieties, &c. Bodily deformities, including wry tail, squirrel tail, crooked toes, &c. Any competitor found guilty of faking will be disqualified and debarred from entering future competitions.

Birds gaining 75 or more points in each of the above standards will be placed in the first class. Any bird failing to obtain 50 per cent. of the points allocated for any one feature will be passed out.

In classifying the pens the following rule is adopted:—If all birds are Class I., the pen is Class 1. If one of the six birds does not pass, the pen is Class 2. If two of the birds fail to pass, the pen is Class 3. If more than two fail to pass, the pen is Class 4.

Only those placed in Classes 1 and 2 were eligible for the *True to Type Prize*.

[TO BE CONTINUED.]

THE CHINESE LANGSHAN FOWL.

By D. WALLACE, Rocklea, Langshan Breeder.

Nearly half a century ago the fowl known as the Chinese Langshan was introduced into England by an officer doing duty with his regiment in North China. This gentleman sent some of these birds to his uncle (also an army officer), named Croad, in Birmingham. Some five years later the breed made its appearance in America. In both countries the bird found many admirers, and quickly established a reputation as a layer and a table bird.

“Shanghais” and other breeds, that have since undergone considerable changes, had been previously exported from the coastal districts of China to European and American breeders; and the Langshan would have become known to Westerners many years earlier than it did if the Langshan Hills, from which it came, were as accessible from the coast then as they afterwards became.

Considerable opposition was evinced by breeders of Black Cochins and other breeds towards the new arrivals in the realm of Western poultrydom, and many of them claimed that the Langshan was merely an inferior Cochin, though the Langshan’s deep black plumage and lovely green sheen was the best thing in the way of black poultry colour the world had up till then seen.

The breeders of black fowls endeavoured to secure this Langshan black in their flocks, but were baffled by the persistent way in which other Langshan characters asserted themselves in the Langshan crosses, proving the great prepotency possessed by the Langshan, and, incidentally, that it must, even in those early days, have been a very long-established breed. So that through sheer merit the Langshan overcame all stupid opposition and forged ahead to the place it occupies to-day—in fact, the Langshan characters are so thoroughly fixed that they are almost immutable; and through all these years the Langshan has withstood, in the main, the vagaries of freak fanciers who sought to bring about various changes in the breed.

The “Croad” school have lengthened the leg and reduced fecundity. The “modern” school have increased size and also reduced fecundity. The outstanding characters, apart from the all-important feature of productiveness, remain virtually the same. The original Chinese Langshan still easily remains the best.

The winter of North China is both excessively cold and excessively damp; and the summer is very hot. A hen to lay under these conditions and lay well enough to pay, where poultry produce is cheapest and competition keenest in the world, must needs be a good hen. When she has done laying enough to pay, she

must be good enough for market. That is why the Langshan is such a valuable bird. If the breed were otherwise, it would never have survived.

The Langshan found its own type. No "expert" or judge or freak fancier fashioned it. No club drew up at the inception of the breed the "points" to be sought after. No poultry shows—at which "judges" criticised the points of its comb, the curve of its sickles, or the length of its toenails—figured in the breed's early history. At least, during two years' residence in China, I never saw or heard of shows, standards, or judges. The Chinese poultryman argues in this way:—"Breed for productiveness and stamina." When a bird like the Langshan lays splendidly all the year round, being little disturbed by sweltering heat, snow, slush, or bleak winds, and still carries a sufficiency of juicy meat, the type it has acquired can surely not be wrong; so leave its type alone. Don't fool about with it.

So jealously have the money-making qualities of the Langshan been guarded that abdominal capacity and other features indicating productiveness are uniform in a real Chinese Langshan flock to an extraordinary degree.

Black Orpingtons were evolved mainly from Chinese Langshans; and, after all the years the former were bred for Orpington type, no sooner did Orpington breeders in Australia set out in earnest to develop the Langshan productiveness in the Orpington than there was a response, but their job now is to keep the Orpington layer an Orpington, and not a Langshan. Many of the best of them have reverted to the Langshan, except in the leg feathering. The Langshan sticks out everywhere.

Other breeds that got into the hands of freak breeders succumbed in the sense that their money-making qualities vanished and their types changed beyond recognition.

Tegetmeier's Poultry Book shows a picture of some Light Brahmas that were sent to Queen Victoria in 1852. That picture represents the ideal fowl. Birds of beautiful poise, very fair size, and of a type that suggests eggs in every feature—fecundity, stamina, and beauty in one. What is the same breed to-day? Do they answer the above description? Those birds were pictured twenty years before the Langshan ever left China. So how many years earlier than the Brahma must the Langshan have been established to have come unscathed through the stress of all the "fancy" fired at it in different lands since 1872?

At a time when, a few years ago, the 200-egg hen in Australia was a wonder, birds of a strain of Langshans imported direct from their ancient home put up an average of 243 per bird at the Hawkesbury Agricultural College. Nothing new to the Langshans, this heavy egg production; just a matter of habit.

At the time of writing, a Langshan team at Hawkesbury is in the lead. They also hold 3rd, 4th, and 5th places; and they are easily ahead of all the Leghorns, the pick of all New South Wales. They lay large brown eggs, and lay early. They are not excitable, nor are they fliers. They stand confinement well, and are hardy, being quite at home roosting in the open, day or night, in any weather. The skin is white, and the flesh is of fine grain and most palatable.

Already busy-bodies have begun tinkering with this grand old breed here in Australia. Somebody—whose great-grandfather was a toddler when the Langshans had been long established—has discovered that the Langshans should be made a "heavy" breed. Somebody else wants to make them a "light" breed. Some club or other has adopted a standard defining the colour of its toenails and the precise number and length of points in its comb. The Langshan smiles and goes on her way shelling out eggs. She has withstood all this "fancy" before.

Seeing what a profitable and beautiful bird the Langshan is, it is really astonishing it has not been widely adopted by the practical people of the Commonwealth. But they are making up for lost time now, and Langshans are displacing other breeds everywhere. Already thirteen teams are in evidence at Hawkesbury, most of them at the top of the list.

There is also a white variety. The White Langshan originated as a mutation or, in poultry parlance, a "port" from the Blacks, as that grand variety the White Wyandotte, and also the White Campine, sprang from the Silvers. Like all mutants, they possess great stamina. The White Langshan is a beautiful bird, but being held sacred in China they can be got away only by strategy. Black is the Chinese "glad" colour, and white the mourning colour.

The Chinese Langshan bids fair to oust from public favour that Langshan cross, but withal most useful bird, the Black Orpington. A truly handsome bird is the Langshan, and she appears to realise that "handsome is as handsome does," for certainly she is a most handsome doer.

Horticulture.

SOME PHASES IN THE CULTIVATION OF SWEET PEAS.

[Paper delivered by Mr. F. PHILLIPS at the Sweet Pea Show of the Horticultural Society of Queensland, held in the Albert Hall, 7th August, 1920.]

It is not my intention to cover the same ground as in my previous paper; therefore I shall only refer to some particulars which may need correction, or which may call for emphasis. I will deal, first of all, with cultivation, and then with ailments, &c.

CULTIVATION.

I must again strongly emphasize the necessity of adhering to the following timetable for show purposes:—

Sow the seed sixteen weeks before the first show (July); you will then have the first blooms in ten weeks (always provided that you have not commenced to top-feed), leaving six weeks in which to develop blooms fit for the show bench. The plants and flowers will improve gradually until Exhibition time (August), when the blooms will be at their very best. From then on to September, the plants will gradually deteriorate, with a consequent deterioration of bloom, but with attention and judicious feeding high class blooms should be staged at the September show. Great care should be exercised in feeding. It is very important that no liquid manure should be applied earlier than thirteen weeks from the sowing of seed; then only a weak infusion given weekly. After the first show (July), the liquid may be given stronger, increasing in strength gradually as the plants gain vigour. I am still of opinion that the extravagant use of manure, when preparing the ground, does not give the best results. The method of digging in a large quantity of animal manure when preparing the ground, sufficient to last the season through, deprives the grower of any control whatever over his plants. That is to say, should he put in too much manure, the plants and flowers will be overgrown throughout the season; if he puts in too little and does not top-feed, he will not produce high-class show blooms. Too heavy manuring and the too early application of liquid manure will result in an extravagant growth of plant and, naturally, blooms that are coarse in texture, dull of colour, and badly placed on absurdly long stems.

It has been my aim since I first grew sweet peas and realised the possibilities of their improvement, to cultivate them with the view of increasing the size of bloom, brilliancy of colour, and length of stem, at the same time preserving their natural gracefulness. In this endeavour many experiments have been made and expedients resorted to and several varieties have been discarded, some for not responding to kind treatment, and others for responding too freely by running away to stems at the expense of the flowers. I am quite satisfied that results have amply repaid me for my work.

The tendency of growers in the Southern States is to grow extremely long stems, and I am afraid that judges are being educated up to awarding merit to such inferior stuff. This has been the case in England. In Brisbane, happily for the reputation of the Queen of Annuals, it is recognised that the gracefulness of the sweet pea is its chief charm, and to destroy that charm by overgrowing is almost sacrilege. Our judges do well to discourage overgrowing, and our growers know that to stage absurdities is to court failure.

To show that we are on the right track, it may not be out of place to quote some extracts from "The National Sweet Pea Society Journal" on the subject.

"LONG STEMS v. QUALITY AND REFINEMENT IN SWEET PEAS.

"In many instances, I am sorry to say, even at our leading shows, collections of Sweet Peas, including many of the prize-winning stands, resemble a forest of green stakes rather than what might be a brilliant display of the most gorgeous, the most refined, and the most popular flower in cultivation, as well as being the least expensive to cultivate. Indeed, we often see travesties of blooms on the top of enormously lengthened and often bloated-looking stems exhibited at some of our best shows.

“It has become the custom to speak of the stems and not the blooms, such as ‘Look at those splendid stems,’ &c. The judges at our leading shows are greatly answerable for this state of affairs, which is all too common, but one could only sympathise with the judges at the N.S.P.S. in their task of judging the show of 1916, as the majority of the exhibits were composed of Sweet Peas whose only qualification seemed to be that of extreme length of stem, and poor colour. I grant that the extremely wet season influenced this result, yet much might have been done, by modifying cultural methods, to prevent the production and the exhibition of extremely lanky, attenuated stems in some cases, and huge bloated and distorted stems in others. It is quite possible that many growers were quite unable to prevent the production of the extreme length of stem noticed in many cases, especially with the continually heavy rainfall and where unduly large supplies of rank farmyard or other manures such as pigeon manure, &c., were incorporated with the soil.

“This shows the folly of allowing the passion for long stems to overcome all other considerations, because some of the growers who aim at size of bloom and quality, as opposed to length of stem only, had some admirable exhibits, and it is remarkable how the same growers consistently exhibit the same type of bloom quite irrespective of the season. This seems to point that the responsible conditions are more cultural than climatic.

“I hope no one will misunderstand me or misconstrue this statement in the belief that I am advocating short stems or condemning modern culture, as the reverse is the case; but I do condemn those growers who, to produce twenty-four inch stems, sacrifice almost everything that is beautiful in a beautiful flower, a flower which has such a fascination that its devotees continue to grow it in many cases under the worst possible conditions, excepting that it is one of the least expensive of florists’ flowers to cultivate, but no other popular flower gives such a continuous supply of blooms for such a long period.

“In recent years many growers have disclaimed to grow entirely for length of stem, yet nevertheless their methods of staging refutes this statement. Decorative effect and the necessity for displaying individual blooms, is entirely sacrificed by packing the stems together with the heads touching each other and almost level, the general effect of the bunch resembling nothing but a sheaf of corn, cut green, with the ears coloured. This is done solely to provide a splash of colour which is often brilliant, but which on close examination reveals the obvious defects. The bunches might just as well be pieces of brilliantly coloured silk, as all traces of individuality in the blooms are entirely eliminated. Why do these growers find it necessary to pack them thus? Solely because if they were displayed individually they would betray gappiness, irregular placement, poor thin texture, dull, lustreless colour, and weak top blooms, which frequently exhibit a pathetic droop as if protesting against the treatment meted out to them, and I am sorry to say that these exhibits frequently win prizes. These growers entirely lose sight of the fact that no flower is pleasing to the eye unless it is proportionately developed, and no one can object to long-stemmed Sweet Peas providing the blooms *are* proportionately developed, but I maintain that if a length of 18 inches is exceeded the stems are lengthened only at the expense of colour, size, and substance, and above all, placement. The aim should be to produce four fully developed blooms of good colour and texture well placed on the stem. Also the top blooms should not be small and quite out of proportion to the others, as they are frequently seen. These top blooms seem to suggest that as the stems have lengthened so excessively it is quite unfair to expect them to develop.

“Many of the exhibits of recent years have done much toward exciting the somewhat unfair criticism which we hear on all sides and that we sometimes see published in the horticultural press. This criticism is justified considerably, yet it does not reach the root of the evil; we constantly hear of coarseness, but the critics are often unable to describe a coarse Sweet Pea without falling back on the old excuse that they are too large. This I dispute, as no Sweet Pea bloom can be too large providing it is proportionate in all details, including good colour, which is one of the main reasons for growing flowers. I also maintain that any stem is long enough, providing it is long enough for the decorative purpose for which it is intended. Quality should be the supreme test. Many of our critics condemn modern Sweet Pea culture in a wholesale manner, especially those, I am sorry to say, who from various reasons are unable to grow good blooms themselves, but I am compelled to say that exhibits such as I have mentioned give them some justification.”

“In looking forward, one must not forget to remark on some of the present-day methods of cultivation. That they are not as they should be is not entirely the fault of growers. One sometimes sees the premier prize at provincial exhibitions given to an exhibit that only has length of stem to recommend it, the blooms being badly placed on huge stems, the top flowers very small in comparison, and the spikes

bunched together to hide these defects. We must not sacrifice quality of bloom for length of stem, and I, for one, sincerely hope judges will discourage it."

"Lavender George Herbert was regarded by the judges as the best vase in the show, but the decision was subjected to much adverse criticism. The blooms were badly placed on several of the stems, one in particular having the top and bottom pairs separated by a space of $5\frac{1}{2}$ inches."

You will therefore see that the evil is rampant in Great Britain, and it will be most difficult to eradicate.

Growers for show purposes are advised to exercise great care in selecting varieties. Choose pronounced self-colours—reds, blues, pinks, with white, cream, maroon, and as there is only room for three flakes, choose the best. To keep up to date, grow two or three varieties with reputation for trial, and if they do well, cast out varieties which do not give as good results. Be careful not to grow too many varieties. Lay out your plans for what you intend to show next season. It is advisable to duplicate one red, a white, and a blue. A plan I have adopted with good results is to allow for the plants to be a foot apart, with two stems. If you lose a plant from any cause, grow the plants on each side with three stems. By this method, unless you have very bad luck, the requisite number of stems may be retained.

Although the natural Sweet Pea stem carries three blooms, it is desirable to produce four blooms on a stem, and with many varieties, these are easily obtained. Do not strive after fives and sixes on a stem, because, in nearly all cases, they are inferior flowers or malformations, such as double stems, &c., which are generally the result of overfeeding.

AILMENTS.

I will now deal with some of the ailments of Sweet Peas. The various phases to be referred to have been experienced by myself; in fact, they are with us, more or less, every season, and have called for serious thought and watchfulness in trying to discover the causes. I have heard several opinions expressed, but no real effort seems to have been made to get to the root of our troubles. The non-flowering of plants is a common trouble when growing for show, and is caused through the top soil being over manured, or by the too early use of liquid manure, or both, the result being a rampant growth of plant. I have already emphasized the danger of overfeeding, even when the plants have commenced to bloom, the result being that the plants will miss flowering for several joints; so also, if you feed too soon, the commencement of flowering will be delayed. I remember one case of a grower, some of whose plants would not flower, feeding them up. Of course, the more he fed them, the more they grew until, in sheer desperation at a height of 10 feet, they threw out a bunch of about a dozen heads and no flowers. This is one of the evils of being too kind to plants.

Dropping of buds is also very common, but a trouble which is easily overcome. It is the result of too much watering. The present season is bad in this respect. The month of May being very dry made copious waterings necessary. Heavy rains in June and July caused an excess of moisture, hence bud dropping. Cease watering for a few days and the plants will recover.

We now come to two of the most serious ailments. I will term them, "Plants running out," and "Yellowing of plants." Although bracketed together, I propose dealing with them separately, because I believe the cause to be the same in both cases. It may be necessary to explain what I mean by "plants running out." Although the seed germinates equally well, some plants are weakly, and the head of the stems will gradually become smaller and smaller, until it eventually disappears and the plant is done. Most of such plants will bear sickly flowers, at the same time yellowing up. This season some of my plants ran out before flowering and without any yellowing. The "yellowing of Sweet Peas" has been more serious this year than is usually the case, and very speculative theories as to the cause have been advanced. Some call it a disease brought about by high cultivation. How about those who do not highly cultivate? Is it in the seed? In my opinion, it is not so. I save and

use the seed from my strongest plants year after year, with, I think you will agree, fairly good results.

In an endeavour to arrive at the solution of a problem which has engaged my attention for the past four years, I have pieced together certain data which have come under my notice. In August last, when in Sydney, I called on Mr. Ifould, one of the most successful show growers, and his plants had the ailment so badly as to run all chances of success that season. He attributed the cause to too much rain. Up to a certain point, the season had been dry, and the plants had been freely watered. Then heavy rains set in—hence his conclusions as to cause. So far as I can remember, it was his third year of growing on the same ground.

Two years ago, Mr. Whitfield, one of our successful growers, was troubled with the ailment, but after removing the top soil and thoroughly washing the surface roots, a considerable number of his plants partially recovered. It was a very dry season and the plants had been watered very freely—third year on same ground.

Three seasons back, my plants were attacked, not seriously, but badly enough, under similar conditions—a dry season, with free use of hose, and the third season of growing on the same ground.

This year I have the same trouble, although it has proved a wet season, but it is the third year of growing on the same ground.

The instances I have quoted seem to indicate that the plants are attacked more seriously the longer they are grown on the same ground. Another thing to observe is, that the plants are attacked at two periods—before they have attained their full vigour, and towards the end of the season, when they are losing vigour. It is well known that legumes need a large amount of nitrogen, and generally that they return a large amount to the soil. The Sweet Pea, although leguminous, is, in my opinion, in quite a different class. It requires a large amount of nitrogen, denudes the soil of that element, and returns nothing. The soil being thus denuded of the most important element, with a consequent serious reduction of bacterial activity, the absence of which renders chemical fertilisers practically useless, produces plants of weakly growth, very susceptible to fungus disease. The repeated growing on the same ground, the copious watering, the long growing period during our winter months, when the purifying effect of the sun is at its lowest, all tend to produce sourness of the soil and the formation of fungus. With this and other data to work upon, I have formed the opinion, whether rightly or wrongly—(1) that our Winter Flowering Sweet Pea is still free from any constitutional disease; (2) that the probable cause of the trouble is the exhaustion of a certain element in the soil, which I believe to be nitrogen, resulting in weakly growth of plant and susceptibility to fungus disease, which is caused by sour soil; (3) that the trouble is more prevalent in the third year of growing on the same ground, regardless of weather conditions. The use of superphosphate, which is known to have an acid reaction on sour soil, may also be a contributing cause.

In conclusion, I would suggest, as a means of avoiding the trouble—

- (1) Not to grow more than two seasons on the same ground.
- (2) To renovate the soil by growing a green manure crop.
- (3) The liming of the soil to produce sweetness.
- (4) The use of Holborne Island phosphate, which contains a considerable amount of lime, instead of superphosphate.
- (5) An increased application of nitrogen.

A PESTILENT WEED.

A weed which causes much trouble to horticulturists is widely spread in numerous flower gardens. It is often called by amateurs a trefoil, but the true name, as given by Mr. C. T. White, Government Botanist, is *Oxalis corymbosa*, which has a pretty pink flower and a small carrot-shaped root, which in the summer time is crowned with a mass of bulbils which, about the spring time, cling closely together. As the summer approaches, these ripen and fall off, when each will form an individual plant. Mr. White says that the practice adopted at the Botanic Gardens is to attack these plants in the spring (*i.e.*, from now on) before the little bulbils fall off from the parent plant.

Tropical Industries.

SUGAR CANE PLANTING IN THE NORTHERN DISTRICT.

The General Superintendent of the Bureau of Sugar Experiment Stations has received the following report from the Field Assistant, Mr. J. C. Murray:—

“Planting is going on vigorously, and next season should, with ordinary good fortune be a large one. Farmers are cultivating every available acre of ground, and warm weather, very suitable for planting, is still holding.

“Plenty of labour is available of an efficient sort, and differences of opinion regarding prices between sugar millers and growers appears to be amicably settled.

“The new varieties that were distributed from Mr. Mackersie's plot last year are doing well under field conditions, the best probably being Q.855, Q.1098, Q.813, and Hybrid No. 1. Mr. Craig, a Klondyke farmer, has achieved some fine results from these canes, and any farmer wishing to see them growing should have a look over this gentleman's place.

“With regard to these latterly distributed varieties, I find that the best time to plant in the Ayr district is about June and July. Being vigorous strikers and rapid growers, the Queensland seedlings, if planted too early, have a tendency to grow to great size, which is detrimental to the sugar content, and show an inclination to arrow. Planted about July, though, the Q.855 is an especially fine cane for a plant crop, with a high sugar content. The New Guinea canes are not shaping as well as those raised in the Australian tropics. N.G.103 is about the most attractive of these varieties, having withstood the drought and generally bad weather conditions prevailing during the last twelve months, about as well as any of the New Guinea varieties, in addition to having better striking and early maturing properties.

“The Q.813 is not doing as well on the Lower Burdekin as elsewhere in the State, although conditions on the Haughton River appear to suit this cane.

“Owing to prolonged spells of drought and flooding by means of irrigation, combined with, in many cases, insufficient cultivation, the acidity in most of the cane soils is pronounced, more so on the Lower Burdekin than on the areas between Ayr and Townsville.

“The average reaction of soil right throughout the district is, however, distinctly acid. Supplies of lime have become absolute necessities, if the tonnages are to be maintained on irrigated areas.

“The new Haughton Mill is rapidly approaching completion, and is up to date in every particular. This is undoubtedly a good speculation on the part of the farmers here, as in the past their enterprise has been cramped by lack of milling accommodation. That is, however, now overcome, and these fertile areas will soon be producing more cane than they have been doing.

“Pioneer Company is taking a keen interest in the work of experiments and fertilisation, a factor which must benefit the district largely. Growth of varieties and results of irrigation and manuring are being tabulated in an instructive and useful manner. Mr. L. Smith, the mill manager at Pioneer, is chiefly carrying out the work.”

SUGAR CANE IN THE NORTHERN DISTRICT.

The General Superintendent of the Bureau of Sugar Experiment Stations, who has been visiting several of the northern sugar districts during the past seven weeks, has returned to Brisbane.

Reporting on his trip, Mr. Easterby said that the first district visited after leaving Brisbane was Mackay. Good rains set in on this area in January, which were followed by dry conditions until April, when a belated wet season set in. Due to the severe check caused by the absence of the usual wet season in February and March and the dry conditions of 1919, the cane, while it had made a remarkable recovery, had missed too much favourable growing weather to make a full crop. The cane, however, was green and vigorous and growing rapidly, but the crushing

is expected to be a medium one, though there is still time for the cane to improve, as the commencement of harvesting operations will be late this season in Mackay. Should favourable weather conditions continue, the crop next year should be a great one, as everywhere throughout the district, growers were preparing land for planting. A highly successful field day was held at the Mackay Sugar Experiment Station on 19th June, at which about 300 growers attended.

The necessity of increasing our sugar production was made the subject of an address by the General Superintendent, and after a thorough inspection of the experimental work a demonstration of field implements were carried out in the afternoon. The work of the Experiment Station was found to be progressing satisfactorily, and the station grounds and cane presented a fine appearance.

At Cairns, which was next visited, grubs were found to be doing a great deal of damage in many parts of the district. The D.1135 variety appears to be more resistant to grubs than Badila or Goru, and is coming more into prominence on the Cairns areas. At one large estate it is stated that out of an estimated crop of 12,000 tons only 4,000 tons will be cut, the remainder having been destroyed by grubs. On this estate it is estimated that the loss by grubs during four years has been 98,000 tons of cane, an immense monetary loss. The cane generally about Mulgrave and Hambleton was more or less backward for the same reasons as given in connection with the Mackay district. However, the crushing at Mulgrave and Hambleton will be good, the cane having made a better recovery than at Mackay. Babinda also anticipates a fine crop, and the density of the cane in this district was decidedly improving as the crushing proceeded. The mill was working exceedingly well at the time of Mr. Easterby's visit. In all the Cairns districts large areas had been, or were, in course of planting for next year. A meeting of growers was held at Babinda to deal with cultivation and other questions.

Due to the severe cyclone experienced at Mossman during February, the cane was found to have suffered a great deal, particularly the variety known as Clark's Seedling, large numbers of the sticks of which were badly broken, as was also the case in Mackay in the 1918 cyclone. This has put the district back, and though the farmers have repaired their dwellings, &c., they have had a hard knock in the damage done generally by the cyclone. About 50 per cent. of the cane grown here is D.1135. There are very few grubs about, and the cane is healthy and good.

The rat pest, once so prevalent here, has also diminished. An inspection of varieties growing on Messrs. Crees Brothers' farm was exceedingly interesting. Some years ago a number of seedlings were found on the sandy bank of the Mowbray River, below a field of cane. These seedlings were propagated and there are now some ten being grown experimentally at the farm in question. Of these, the one known as Mossman Queensland No. 1 is apparently the best. The stick greatly resembles Badila, but the top is different. The Mossman Mill expect to crush about 50,000 tons of cane this year.

Fine crops of cane were observed at Innisfail, and a good crushing is anticipated. While the cane here has not made the growth it would have done under more favourable conditions, it had grown wonderfully well during the past three months. Much of the cane upon the South Johnstone area was already arrowing. The cane generally was not much affected by grubs. The new experiment station at South Johnstone was looking particularly well, and the cane planted last October had grown into a very fine crop. Many of the varieties had made tremendous growth. The fertilising experiments were also showing up well. A well-attended meeting of canegrowers was held at Innisfail, at which many questions affecting lime and fertiliser were brought forward. Some grubs were observed at Fisher's Creek, but there does not appear to be many of these in other parts of the district.

Ayr was the last district visited. The cane here in the early part of this year was in a very backward condition, but since the late rains it has made amazing growth and the crushing will now be a medium one. Grubs have been noticed attacking cane about Ayr for the first time, but this occurrence is not, so far, large. A good deal of cane, however, about the Haughton is affected by this pest. Large areas of land are being put under cane in all parts of the district. The re-erection of the Invicta Mill at Giru, Haughton River, is proceeding most satisfactorily. This mill, which formerly served the Invicta district, near Bundaberg, was dismantled and shipped to the new proprietors, the Haughton Sugar Company, Limited. The whole of this mill was sent by train and steamer, and it is stated that no piece of the building or machinery was lost in transit. The mill building is now practically completed, and very little of the machinery remains to be put in position. It is expected that the work will be completed in November, but owing to the small crop this year, the mill will not start operations till 1921. A splendid job has been made of the removal and re-erection, the contract being in the hands of Barbat and Sons, of Ipswich.

At Mr. Mackersie's farm, Ayr, the variety known as H.Q. 458, recently sent up by the Mackay Sugar Experiment Station, was found to be doing well. Very fine crops of Q. 855, another of the station canes, were observed at Pioneer Mill and upon Mr. Craig's farm. This latter variety is preferred by some farmers in the Ayr district to the Q. 813, which also appears to be doing well.

The new irrigation works at Home Hill are progressing, but the difficulty in procuring cement and electrical supplies is hindering the work of completion. A magnificent display of cane was made at the Lower Burdekin Agricultural Show, the exhibition of stools of cane being probably the finest ever shown. These included some very large stools of the Badila cane from the river bank country. The champion test was won by the variety known as B. 208, with 18.35 per cent. of commercial cane sugar.

Summing matters up, the General Superintendent stated that the crops above Townsville were almost all fine and would produce a good tonnage of sugar. Below Townsville, however, the crops were only medium to poor, so that the South would be largely responsible for the deficit in this year's output. It is gratifying, however, to note that large areas are being got ready for next year, so that, should good weather conditions ensue, the 1921 season may easily be a record.

THE SISAL FIBRE INDUSTRY.

The exhibit of sisal hemp by the Department of Agriculture and Stock at the late Exhibition, clearly demonstrated that the plant producing this valuable fibre finds a congenial home in Queensland, from the southern border to the farthest north and west. During the years of war the demand for sisal could not be taken advantage of by the countries producing it, owing to shipping difficulties. The price accordingly rose to something like £150 per ton, but growers in East Africa and South America were compelled to store their crops for a time. It will possibly interest both growers and utilisers of this fibre in Australia to note what is reported by the June issue (1920) of the Monthly Hemp and Fibre Report.

Of Manila hemp, we need say little, as this fibre has never been produced industrially in Queensland. Concerning Maguey fibre, Mexican and East African sisal, the report is—

“Maguey Fibre.—Quiet, with a small turnover. Cebu No. 1, £—; Cebu No. 2, £50; Cebu No. 3, £46; prompt or June-July shipment.

“Mexican Sisal.—Of no interest to Europe, chiefly on account of its low quality, but a fair amount of business is being done with the United States at 8 cents per lb.

“East African Sisal.—Recent heavy arrivals have, to a great extent, been disposed of at £56 to £56 10s. for best quality, £52 to £53 for No. 1, and £46 to £47 for No. 2. The quality, however, leaves much to be desired, hence present somewhat low prices, which will scarcely tend to stimulate production.

“Java Sisal.—No business reported, which is scarcely to be wondered at owing to the low prices ruling for African sisal.

“Mauritius Hemp.—Next arrival of about 1,200 bales expected in ten to fourteen days. Market on the easy side for all grades except prime quality, which is in good demand, but there is none offering for the moment. Values: good, £50 to £52; good fair, £49 to £50; fair, £46 to £46 10s.”

Both sisal and Mauritius hems can be plentifully produced in this State. The labour conditions have, however, for a long time made it impossible to produce the fibre at a profit in Queensland, and hence the collapse of an industry which a few years ago promised to figure largely in our exports.

VARIATION IN COCOANUTS.

Some years ago a bunch of cocoanuts was obtained from the North-Western Province, which bore both yellow and green nuts. Of the five nuts on the bunch, three were green and two yellow. The main stalk of the bunch was longitudinally striped with green and yellow, the side branches which arose from the green areas being green and bearing green fruits, while those arising from the yellow areas were yellow and bore yellow fruits.

Two nuts of each colour were planted, but only two germinated, fortunately one of each kind. These two plants have since been growing side by side. The plant from the yellow nut has a distinct yellow tinge, with a yellow or bronze midrib to the leaves.

The two plants, though still small, are now beginning to show a distinct difference in size, the leaves of the green plant being noticeably longer than those of the yellow.

The occurrence of yellow nuts on a tree which otherwise bears green nuts is an instance of what is usually known as chlorosis—*i.e.*, a deficiency, or marking, of the green colouring matter of the plant. It would be expected that in such a case the yellow plant would be of slower growth than the green one. The precise form of this particular example of chlorosis has not yet been determined, as it has not been possible to devote time to its examination.

The interest of the case, however, lies in the fact that it indicates that the yellow varieties of cocoanuts may have originated as similar “sports” from the normal green varieties; and the practical bearing of this is that, unless yellow varieties are desirable on account of other qualities, they should not be planted because their slower growth, owing to their chlorotic condition, will render them less profitable than the green varieties.—“Tropical Agriculturist,” January, 1920.

TANNING HIDES.

Amongst the various tanning materials, oak bark (*Quercus robur*) is the most useful; and the excellence of British sole leather is due, in a great measure, to the superior oak bark produced there. Next in importance comes the Mimosa or wattle bark of the genus *Acacia*, the tannin contents of which range from 15 to 35 per cent., and the richest of the Mimosas (the Black Wattle) tannins imported into England (pre-war) were the Black, Gold, and Silver Wattle from Queensland and Tasmania. All the vegetable tanning materials are reduced by grinding to a uniform size, and are subject to the following processes. This is done by a series of “leachers” or “spender” pits:—

The new, fresh bark is put into the first of the series of pits, and over it is pumped (cold) the well-strengthened ooze from the next leacher. In the first pit the ooze or infusion is brought up to the full strength required for the “lay-away” tan pits; and after the infusion is pumped off the tan it is passed over to No. 2 leacher, where it is treated with liquor also somewhat lower in strength. In this manner the bark passes by stages through a series of pits, diminishing in richness in tannin at each stage, till in the last of the series it is fully exhausted with pure, warm water. Finally, this pure water is put in at one end of the range of pits and fresh tanning material at the other.

The hides of cattle are received at the tanyard in four different conditions. These are—(1) market or slaughter hides, which are soft, moist, and covered with dirt and blood; (2) wet, salted hides; (3) dry, salted hides; and (4) sun-dried or “flint” hides.

On arrival at the tannery, they go through a variety of treatment to clean them, free them from salt, and soften the hard dried hides, and to get rid of the lime used in the dehairing process. They are then passed through the tanning pits, hides which were at the top of one pit being placed in the bottom of the next. This handling process takes six weeks, after which they remain another six weeks in the “layers,” when these pits are cleaned out and replenished with fresh ooze, hides, and tan as before. These processes may be repeated three or four times before the tanning is completed, and the whole operation varies from one to four years for heavy leather.

The yield of leather per hide varies. As a rule, it may be said that 100 lb. of green hide will yield 40 to 50 lb. of leather; 100 lb. of green hide, however, when deprived of hair, flesh, and moisture, will weigh only 18 lb.; 100 lb. of dry hide, when fleshed and haired, will weigh 85 lb.; and the yield of leather will be from 180 to 200 according to the tannage, the absorption of tanning being as high as 90 per cent.

Botany.

THE WHITE CEDAR (*MELIA AZEDARACH*, VAR. *AUSTRALASICA*): A PLANT POISONOUS TO PIGS.

By C. T. WHITE, F.L.S., Government Botanist.

During the past couple of months several samples of berries* taken from the stomachs of pigs supposed to have been poisoned have been forwarded to the Department for determination. On examination these berries have proved to be those of the White Cedar (*Melia azedarach*, var. *australasica*), a very common tree in many coastal dairying localities from the Tweed River to the extreme North. It is also commonly planted for ornamental and shade purposes, and being hardy and drought-resistant is extensively used for street planting, &c., in and about many inland towns.

Judging by the specimens sent in, many farmers are unacquainted with the tree and its dangerous character when growing about pig yards and sties, and the following notes and illustration are, therefore, published to bring the matter under notice:—

Several cases in the Beaudesert district recently of pigs having been poisoned by White Cedar berries have come under the notice of the local Stock Inspector (Mr. J. H. McCarthy), who, in a letter dated 18th June, 1920, stated that “it has no doubt caused heavy losses in the district.”

H. R. Brake, Deeford, Dawson Valley Line, wrote, under date 24th April, 1920:—“Will you kindly analyse the enclosed berries, as I have lost twelve pigs? On the dead pigs being cut open, each had these berries in the stomach, from which I conclude the berries must be poisonous.”

W. L. Guy, of North Rockhampton, wrote, under date 14th July, 1920:—“I had eleven pigs seven weeks old and wishing to wean them placed them in a pen in which was growing a tree locally known as ‘White Cedar’ or ‘Queensland Beech.’ I enclose fruit and leaves.† The pigs ate liberally of the fruit; and within twelve hours two were dead, and thirty-six hours later another one died. Three more were affected with cold extremities, shivering, and partial paralysis of the front legs. I dosed them with castor oil, and put them in a warm box. Those treated recovered. I examined the contents of the stomachs of the dead ones, and found whole fruits and portions of others of the ‘White Cedar,’ which I thereupon concluded contained the poison.”

In New South Wales the fruit has often been blamed as the cause of the death of pigs, numerous cases being cited by the State Botanist (Mr. J. H. Maiden), who gives a very full summary in his “Forest Flora of New South Wales” (Vol. III., pp. 94-97). He quotes one instance where the plant was growing as an ornamental tree in the grounds of a public school, and a child was taken suddenly and seriously ill through eating “some berries that grew on the White Cedar tree in the playground.”

Melia azedarach L., is a common tree in India and the Eastern Archipelago, and is widely cultivated throughout the warmer parts of the world as an ornamental species. The Australian form has been designated a distinct variety (var. *australasica*) by the late C. de Candolle in his monograph of the family (Meliaceæ) to which it belongs.

* Technically, the fruit of the “White Cedar” is a “drupe,” not a “berry,” these two terms having definite and restricted meanings in botanical terminology; but, as the fruits of this tree are always popularly spoken of as berries, this term has been used in this article.

† The name “Queensland Beech,” if in use in the Rockhampton district, is to be deprecated, as this name is generally applied to species of *Gmelina*—e.g., *G. Leichhardtii* of Southern Queensland, and *G. fasciculiflora* of Northern Queensland, respectively.

In America V. K. Chesnut ("Preliminary Catalogue of Plants Reported Poisonous to Stock"—Ann. Rept. Bureau of Animal Industry, U.S.A., 1898, p. 406) says:—"Much cultivated for ornament and sparingly escaped from cultivation in the South. A correspondent from Arizona states that three of his hogs were poisoned by eating the seed which was ignorantly offered them as food."

W. E. Safford, in "The Useful Plants of the Island of Guam" (Contr. U.S. Nat. Herb., Vol. IX., 1905), states:—"The berries are poisonous," and then goes on to quote Oudenhampsen.* "who has made a careful study of the properties of this plant," to the effect that the bark contains a substance which is stupefying to fish, and that the narcotic properties are due to a saponin.



PLATE 16.—WHITE CEDAR (*MELIA AZEDARACH*, VAR. *AUSTRALASICA*):
A PLANT POISONOUS TO PIGS.
(About half natural size.)

A strange fact is that fruit-eating birds are said to eat the fruits without any ill-effects following; and I have been told that flock pigeons feed largely on the fruit in the season, and further that ducks and fowls eat the berries with impunity. J. H. Maiden ("Agricultural Gazette of New South Wales," Vol. VII., 1896, p. 564, and "Forest Flora of N.S.W.," Vol. III., p. 95) quotes Thos. Luxton, of Lower Portland, N.S.W., to the effect that "they [the fruits] do not seem to hurt the birds, some varieties of which are very fond of them, notably the green pigeon of the Richmond River, which when these berries are ripe get so fat and lazy as to be easily shot."

* Oudenhampsen, "Bydrage tot de Kennis var. *Melia Azedarach*, L.," 1892.—A work to which, unfortunately, I have not access.

Entomology.

CANE GRUB INVESTIGATION.

The General Superintendent of the Bureau of Sugar Experiment Stations has received the following report upon Cane Grub Investigation, from the Entomologist, Dr. J. F. Illingworth:—

The rainy season, so late in starting, is still with us; and the weather continues favourable for growth. This is very fortunate, since much of the cane, retarded by the drought, has not begun to form in places, and it is doubtful if it will be ready to cut this season. The grubs, too, are still active (15th June); but luckily their damage is not general this season. While I have never seen them worse at Greenhills, there are few other farms that have suffered seriously. I have also had favourable reports from Mossman and the Herbert River. In both of these districts the beetles were abundant during the last flight, hence it is gratifying to learn that noticeable injury from these pests has failed to appear.

Several other pests, however, have been particularly abundant in this district. Among these I may mention cut-worms, locusts, beetle-borers, and a new bug which is transferring its attention from the native grasses to sugar-cane.

OBSERVATIONS ON RESISTANCE OF D. 1135.

In earlier reports I called attention to the deep-rooting habit of this variety; and at various times I have remarked upon its comparative resistance to the attacks of grubs.

In making further study along this line during the past season I find much to commend D. 1135 as a cane for the grub-infested red volcanic soils. A remarkable instance is a field of three varieties, planted for experiment, in an area invariably devastated by grubs, at Meringa. The D. 1135 has Goru on one side and Badila on the other. The grubs have killed the Badila and badly injured the Goru, while the D. 1135 is hurt but little—standing out in marked contrast, between the two devastated plots, with its dark green colour and superior height.

In another field on the same red soil the misses in a field of Goru were planted with D. 1135. The grubs have been bad in the area, but it is remarkable how the stools of D. 1135 stand out dark and green and tall in the midst of the yellowing and dying Goru.

In spite of the fact that I have favoured late planting of cane like Badila, to facilitate thorough cultivation during the flight of the beetles, the present evidence would urge the planting of D. 1135 as early as possible. With this upright variety, cultivation could be continued under ordinary conditions right up to the time that the beetles were ovipositing. Furthermore, the cane being formed, the root system would save it from deteriorating until it could be milled—it would not rot on the ground as Badila does.

ARSENIC FOR CANE GRUBS.

Experiments with arsenic for the control of the grubs are progressing well, and I am pleased to report that exhaustive chemical tests have failed to reveal any trace of arsenic in the juice of cane treated by applying arsenic at the rate of 70 lb. per acre in the drill with the plants. I was able to have these tests made through the courtesy of Mr. W. F. S. Howe, Manager of the Mulgrave Central Mill, and Mr. J. F. Foster, the mill chemist, who went to considerable trouble that all possible tests might be applied. This news will ease the minds of those who have been afraid that some of the arsenic might find its way into the sugar. In any case, the luxuriant growth shown by this cane would have been impossible if it had absorbed the poison into its circulation.

Present investigation demonstrates that it is entirely useless to place poison in furrows on either side of the stools of cane. The first use of arsenic at this station was based upon the supposition that the grubs travel more widely, and ignored the fact that the eggs are usually placed directly in the stool. Hence, to be effective, we now know that the poison must be among the roots of the plant—right where the grubs are at work.

As previously indicated, I am now favouring larger applications of the poison. In all cases it is being placed in the drill at time of planting. In these experiments I use 40 lb., 60 lb., 80 lb., 100 lb., and even 200 lb.—the latter to note any ill-effects upon the growth of the cane.

Every poison plot alternates with a check plot, which is not treated; and there are duplications of the plots in each field, so that an average, which will not be misleading, can be drawn. I favour placing the arsenic in the drill before planting, so that the planter will stir it well into the soil about the plant. I have noted that the men, in chipping, have a tendency to pull the top layer of soil out of the drill, and hence a portion of the poison would inevitably be scattered if it were applied after planting.

To insure a supply of the poison among the roots in the centre of the stool, it may be profitable to make one application before planting and a second after the plants are up—at the time the drill is being filled in by the scarifiers. In testing out this method, I found slight burning of the outer leaves of the young shoots, which is easy to understand, for the poison was applied when the leaves were wet. However, the plants made a quick recovery, when the new leaves pushed up from the inside.

Nevertheless, experiments have demonstrated that arsenic is not injurious to the eyes of the plants, for the cane comes away vigorously, even when placed in the drill in contact with the poison.

Since arsenic is being used rather generally, it may be well to repeat that hypo (hyposulphite of soda), the common fixing bath of photography, is an excellent remedy for any irritation to the skin that may develop when handling the poison. The affected parts should be bathed in a saturated solution of this salt from time to time. With ordinary care, however, one need suffer no inconvenience from handling arsenic.

OTHER TROUBLESOME CANE PESTS.

A serious outbreak of cut-worms (*Cirphis loreyi*, Haw.) has attacked the cane which was recently laid low by the flood of the Mulgrave River. On another occasion a field of young plant cane which accidentally had a fire run through it was attacked in the same way as soon as it began to grow again. This pest is also rather serious, at times, on the grass paddocks, under similar conditions. It is possible that fire and floods so retard the parasites that the pest gets considerable headway before it can be brought into check again. Field observations would indicate that under ordinary conditions parasites are so numerous that very few of these moths come to maturity. On several occasions I have dug up the pupæ in numbers about stools of cane, and I have seldom got one of the moths to emerge—100 per cent. being parasitised. Hence I was interested to note in the flooded area that none of the parasites were in evidence.

Locusts, too, are exceedingly abundant this year in some of the drier areas. The principal devastation is done by *Locusta australis* (Sauss). The young hoppers go in droves as one wades through the grass along the headlands of infested areas. The older insects climb into the cane, riddling the leaves—similar to the work of the cut-worms.

The beetle borer (*Rhabdoenemis obscura*, Boisd.) is rapidly spreading, and we are hearing of them in many districts now that cutting has started. To hold them in check let me urge a general burning of the trash in all infested areas before the cane is cut. In this way the adult beetles are kept from flying away to other fields of young cane, and most of the grubs are killed in the sticks—only those that happen to be down in the root escape. If this practice is carried out the pest can be held down until such time that the parasites become established.

The breeding of the parasites in the large new cage at the station is progressing well. I have had considerable difficulty in securing a sufficient supply of the borer grubs. I hope, now that cutting is starting, growers will send us as many grubs as possible. These, when cut out of the cane, can easily be packed up in tobacco tins with a good supply of the fibre that they chew up in their burrows. If placed in tins without fibre they quickly chew each other up. The tins can be posted to Meringa.

A new bug, common on native grasses, has turned its attention to cane. It belongs to the family *Lygaeidae*, hence is closely related to the destructive chinch-bug of the United States, which also originally fed on native grasses; but turning its attention to cultivated cereals, the damage was estimated at one hundred million dollars for the country in one year. I sent specimens of this bug to Mr. O. H. Swezey, the entomologist of the Hawaiian Sugar Planters' Association, who kindly identified it as *Phænacantha australica* Kirkaldy, a new species which was collected by their entomologists when here several years ago.

The habits of this insect are remarkably like those of the chinch-bug. They hibernate in bunches of grass and trash; their eggs, too, are very similar, and are scattered about in the same way on the soil at the roots of grasses; and, fortunately, they suffer the same natural checks.

The eggs are elongate-oval in shape and very minute, being slightly over one-sixteenth of an inch in length. The colour when newly laid is light amber, becoming darker as the embryo develops. The upper end is docked off, bearing a cap with a number of tubercles, very similar to that of the chinch-bug. The egg is distinctly flattened, and the tubercled cap is tilted well over to what may be called the front. Looking at the back, the tubercles scarcely appear. Edge-view, the diameter is hardly more than half that of the other surfaces.

The newly hatched nymphs begin to appear in April; by July they are exceedingly abundant. The youngest stages are found on the ground at the roots of grasses, where they are hatched, but they soon climb into the leaves of the cane, where they may be found in hoards throughout the winter months (June to September).

The work of these bugs is more noticeable in some varieties, especially Clark's Seedling and Badila. D. 1135 is little affected. The bugs feed on the underside of the leaves, inserting their needle-like beaks and sipping the juice. Since they are continually moving about, it is needless to say that each bug makes numerous openings in the epidermis of the leaf, thus providing easy access for spores of disease. The area punctured becomes light-coloured at first, later yellow, and finally appears as a brown spot, this latter probably caused by a fungus which enters through the puncture. Where the spots are abundant enough the whole leaf soon dries up, starting at the tip and working backward. Hence, during dry weather, when the bugs become so abundant, they are rather a serious pest.

As indicated, multiplication takes place only during the drier part of the year, for humidity soon brings about a disease among them. I have often found the dead bugs sticking to the backs of the cane leaves, with evidence that they had been destroyed by a fungus.

I have not had time yet to study the eggs for parasites, though undoubtedly they are largely held in check by these natural enemies. I have found several predaceous insects feeding upon the bugs. Most common among these are other larger bugs belonging to the family *Reduviidae*, and the omnivorous brown ant, *Pheidole megacephala*.

THE BANANA-ROOT BORER.

Though this insect is not known to attack sugar-cane it may be interesting to record its abundance in banana plantations at Babinda.

While I was in Fiji in 1913, several of the growers were very insistent that this pest turned its attention to cane whenever planted on areas where old bananas had been routed out. I had no opportunity to investigate the matter, but I do not think it likely, since the habits are so different from the borer beetle of cane, though the adult beetles of the two species bear a close resemblance.

CANE GRUB INVESTIGATION.

The General Superintendent of the Bureau of Sugar Experiment Stations has received the following report upon Cane Grub Investigation from the Entomologist, Dr. J. F. Illingworth:—

“As is usual, for this season of the year, the weather has at last turned off dry; thus favouring the harvest of damaged cane, which has been progressing for the past month. The continued rains, well into June, resulted in exceedingly low density in certain areas for the first cut, but the c.e.s. is rapidly rising with the cooler weather.

“On the other hand, climatic conditions have been most favourable for the development of natural enemies of the cane grub; myriads of the grubs have succumbed to contagious diseases, parasites, and the numerous predators.

“NOTES ON CANE GRUBS.

“The long drought, early in the year, has resulted in a peculiar situation for the cane grubs; some are still in evidence (15th July) fully three months past their usual time of going deep into the soil to pupate. Moreover, this delay has proved fatal to the large majority of them in the older-infested districts. The rains

continuing for some time after the cool nights set in brought about conditions ideal for the development of disease organisms, and in some fields these have multiplied with remarkable rapidity.

“NATURAL ENEMIES ACTIVE.

“Among these I may mention ibises, bandicoots, parasitic and predaceous insects, and contagious diseases. In certain fields at Greenhills there is a most remarkable decrease in the number of live grubs in the soil. At first I concluded that they had gone down to hibernate, but digging failed to disclose any of them deeper than 12 in.; natural enemies had evidently destroyed them.

“Excavating recently in one of the worst-infested fields, where earlier in the year there was an average of 100 or more grubs per stool (in one case I found 134), I was unable to get an average of more than four alive. A typical stool, 9th July, gave—

2 in. to 6 in. deep, two alive and one just destroyed by fungus. 6 to 12 in. deep one live and one sick with black spots on skin, indicating a bacterial disease; one dead by fungus; and another dead, with black patches and very soft, due to bacterial disease. None were found deeper, though we dug down 3 ft. The soil was rather dry and crumbly, so that the dead grubs were easily broken up and difficult to discover—only the chitinous head-shield remaining for a time after decomposition of the soft body sets in.

“Furthermore, experiment has demonstrated that diseased grubs usually come to the surface, where they are easily removed by predators—ants, ground beetles, mammals, and birds. In this same field I watched a flock of fully 500 ibises assiduously probing about the grubby stools, and in almost every case the soil had been dug up at the roots by the omnivorous bandicoot in his search for the fat grubs. With all these grub-destroyers at work it is not hard to understand the rapid disappearance of the pest.

“*Muscardine Fungus*.—I have found grubs every year at Greenhills destroyed by this disease. Heretofore, however, the mortality has not been remarkable, for the grubs normally go down to hibernate in March before the cool weather sets in. It is noted from our experiments that an epidemic can apparently only occur when there is lowered temperature and abundant moisture; hence the recent heavy death-rate is just what we might expect from the combination of those favourable circumstances.

“I first noticed this remarkable mortality among the grubs about the middle of June, shortly after the rainy season terminated. In one stool of the thirty-two grubs uncovered twelve had been destroyed by the fungus. The growth was a mass of greenish-white mycelium, extending into the soil for about 2 in. or more from the stiffened body of the grub. In some cases the mycelium had attached itself to the underground portions of the cane, wherever the diseased grub had been in contact; in fact, we often discovered the disintegrated grubs by seeing the gray-green spores or mycelium on some portion of the root system. By the 1st of July the percentage of dead grubs had more than doubled. The first stool that I dug gave twenty-six grubs, but eighteen of them had been destroyed by the fungus. The ibises were in hundreds in this field gathering up the larvæ within reach of their long bills. On 13th July we dug out many stools in the infested area, noting the percentage dead in each; and, though the weather was dry and the soil powdery, the deceased grubs were still everywhere in evidence. In a number of cases all the grubs that we found had succumbed (100 per cent.).

“Following on this important evidence, we made a careful survey of all the infested area at Greenhills to learn if this valuable disease was distributed throughout the plantation. This was done by digging out numerous stools in each of the infested fields, the result being indicated on the plan of the estate by an x for disease and an o for none. By this method I developed an interesting discovery—the fungus appears to be well distributed in all of the areas which are regularly attacked, but we have not been able to find it outside of this well-defined region, especially where the pest, in its erratic flight this year, caused the devastation of fields that are usually immune. Hence, we must conclude that next year's infestation will come largely from the beetles that emerge in these newer devastated areas, *i.e.*, where the fungus has not had time to become established. Apparently the spores, once introduced, continue in the soil from year to year, ready to bring about an epidemic when conditions are favourable. As indicated above, we have learned from experiment that a contagion can be brought about by excessive moisture when the weather is cool. I have demonstrated this with grubs in pots of the spore-laden soil. Hence it would appear that all that we require is water for irrigation under such conditions. The soil became dry too soon, which resulted in a cessation of the

epidemic just before the finish of the last grubs. Undoubtedly one more good rain about the beginning of July would have completed the work.

“*Bacterial Disease*.—During the survey of the muscardine fungus I discovered many grubs which had died of some bacterial disease. The diseased grubs had the same habit, as noted above, of coming to the surface of the soil before succumbing. By digging, specimens were found presenting all stages of the disease, which usually appears at one of the spiracles or in the membrane between the segments of one or more legs. In the latter case the affected appendage soon drops off, and the disease rapidly progresses upward into the body. The affected parts have a peculiar shiny-black appearance, which coincides with that described by Zae Northrup, who gave the name *Micrococcus nigrofaciens* to the organism causing the disease. This friendly organism was found to be well distributed in the United States.* Finally, at death, the body becomes very soft and black all over, totally different in appearance from specimens which have died from the fungus, the latter being hard and cheesy. Naturally, such macerated specimens quickly decompose in the soil, and it is almost impossible to find them after a few days. This accounts for the way that grubs disappear as if by magic in some instances when climatic conditions are just right. The remarkable disappearance of the grubs at Fairymead, in 1909, is a case in point. I have discussed this matter with Mr. Howe, manager of the Mulgrave Central Mill, who was located at the Lynwood Estate at that time, and who made a careful study of the mortality of the grubs.† From all that I can learn, the mites which appeared in such numbers on the sick grubs were only an after-effect—the real cause of death being apparently due to a bacterial disease similar to the above. Mr. Howe also informed me that that district had been free from grubs for years, but that they had begun to give trouble again this past season.

“I am multiplying both this disease and the muscardine fungus, hoping to be able to widen the area of usefulness. Already several hundreds of the diseased grubs have been planted in widely-separated fields where they are not known to occur. It may be possible in this way to establish them in any region where the grubs are normally active.

“*Parasitic Wasps*.—Two species, *Campsomeris tasmaniensis* Sauss., and *C. Radula* Fab., have been particularly abundant. The males are always seen on sunny mornings flying about in swarms close to the surface of the soil in the grubby areas. The females, too, though normally below ground, may be easily observed, for they emerge early in the day to feed at flowers such as those of the Chinese burr, &c.

“By digging numerous pits about 3 ft. deep in infested fields at Meringa, I found that these friends were doing excellent service. The soil was red volcanic, very loamy and rather dry; hence the wasps had gone to remarkable depths after their prey. In most instances the parasitised grubs were down 18 in.—the deepest 24 in. Of the grubs unearthed, 25 to 60 per cent. had been destroyed by these wasps. This is the highest record I have seen, and is undoubtedly due to the lateness of the grubs in hibernating.

“*The Beetle Borer*.—Cutting operations being now in full swing, this pest does not appear to be as abundant as usual in the region about Gordonvale. I have not had reports from other districts, but I trust they have fared as well. The practice of burning the trash from practically all cane before cutting last year evidently accounts for this diminution of the pest. Undoubtedly it is a wise procedure wherever the borer beetle is doing considerable damage.

“Colonies of the parasites (*Ceromasia sphenophori* Vil.) are being liberated, from time to time, from the large breeding cage at the station, and I expect to get a fresh supply of the flies from Mossman, now that harvesting has begun there. Growers in other infested areas certainly owe a debt of gratitude to the Mossman Mill Company, and especially to Crees Brothers, for their kindly assistance in supplying these friendly insects; they have shown a spirit of co-operation it behove us all to emulate.”

* Mich. Tech. Bulletin, No. 18.

† Aust. Sugar Journal, Vol. 1, p. 65.

General Notes.

A NEW FRUIT EVAPORATOR.

The West Australia "Farmer" publishes the following note on a new fruit-drying evaporator, which should be of interest to fruitgrowers in Queensland:—

"Says 'Sarnia Topics': 'After three years' exhaustive experiments, we believe that Mr. Frank Williams, of Adelaide, in conjunction with G. W. Beverley and Percy Short (manager and engineer of Pyap Estate), has secured an evaporation plant which will be a boon to the whole dried fruits industry. The previous 'Vrai' evaporator did the work, but it was too slow and too expensive in fuel costs. The latest invention to be seen at Pyap actually gave us dried sultanas and dried lexias (top grades) within twelve hours from the vine. No need to enlarge on the value of this with apricots, peaches, vine fruits, &c. Its advantages are manifest.'"

A BRITISH COTTON SUBSTITUTE.

Rumour lately was responsible for the information that a substitute for cotton was being manufactured in Germany, but no particulars concerning this have been published. We now take the following paragraph from "Industrial Publicity Service," London, a publication which supplies the Press with the latest reliable information on a variety of interesting subjects:—

"Great interest has been aroused in Great Britain by announcements concerning a textile material called 'cotton substitute.' It is not, however, a new thing, but its revival at the present time is due to the advancing price of raw cotton. It was invented ten years ago by a British engineer, and is a result of a special process of treating 'china grass.' By steeping the grass in certain chemicals the inventor obtains a fibre which can be spun in ordinary cotton-spinning machinery. The resulting material takes dye readily, has a good lustre, and when mixed with cotton yarn produces a hard-wearing fabric. Apparently the only objection to it is its hairiness and harshness, but for certain purposes these qualities would not prove a serious drawback. Experts consider that its main value will be as a union fibre with cotton and wool.'"

WAR ON FRUIT-EATING BIRDS AND RATS IN THE CANE FIELD.

Mr. H. Easterby, Superintendent of Sugar Experiment Stations, in a report on a visit to the Northern sugar districts last July, mentions the damage done to the cane by rats. This pest, which was once so prevalent in the Mosman district, had diminished to some extent. Possibly, the remedy here suggested might be applied with the prospect of entirely eliminating the rat from the canefields. It is not a new idea, however, as we know of a case where, some years ago, a farmer banished all the rats from his barns by the same process.

Mr. J. Jorgensen, of "Mayfield," Southbrook, writes:—

"About six weeks ago I found a way of keeping birds from fruit trees and rats out of the barn. I had only one loquat tree on the farm, and the 'mickey' birds devoured the fruit as soon as it began to ripen. All means were tried to get rid of them, but without success till, one day, the thought struck me that the pieces of worn-out garden hose (the kind with wire twisted round it) looked so much like snakes that it might frighten the birds if placed among the branches. And so it proved. The birds came every day and looked at the loquat tree from a pear tree close by. Some call them 'soldier' birds, but they certainly have not a soldier's courage, as not one of them has ventured into the loquat tree since.

"The rats I have completely banished from the barn, the pig-sty, the dairy, and the house. It is no exaggeration to say that there were hundreds of them, and although we tried many remedies they still increased. I at last remembered that I had seen in some paper a suggestion that if some tar were smeared on a live rat, and he were let go amongst the others, the whole tribe would clear out. So I set my traps and caught five alive, smeared them and others that I caught with tar, and let them go amongst their friends, with the result that before a month had elapsed not one rat was to be seen in any spot on the farm, and that was two years ago.'"

Answers to Correspondents.

CONSTRUCTION OF SUNDIAL.

“NEW CHUM,” Amiens.

Your change of address has been noted. The method of construction of a sundial will be published in the October issue of the Journal, as it is too late to do so in the present number.

HOW TO GET RID OF WARTS ON CATTLE.

“WARTS,” Port Douglas—

Your letter on this subject was, as requested, forwarded to the Stock Department. The Veterinary Surgeon recommends the following treatment:—“Wash the affected parts thoroughly with a strong solution of washing soda in water. Then apply castor oil freely around the bases of the warts. Repeat the treatment every seven days. The warts will fall off. In the majority of cases the warts fall off without treatment.”

For tanning heavy hides, see instructions in the issue of the Journal for November, 1919, page 263.

CONTENTS OF A SILAGE STACK.

In reply to a correspondent wishing to know the contents of a stack silo, the Department's Surveyor (Mr. A. Morry) writes:—

“The weight depends upon a variety of circumstances, such as the age of the stack, the condition of the corn stalks when stacked—whether very dry or fairly succulent; whether any weight has been applied to the top of the stack to compress it; and other such-like conditions. There is no rule by which the weight can be accurately ascertained, for reasons above stated, but if the stack was carefully built, and has existed, say, for twelve months, 60 cubic feet to the ton may be considered a fair average weight throughout.

“The size of the stack under consideration is 10 ft. high, 12 ft. 6 in. long, and 8 ft. wide, which equals 10 ft. by 12 ft. 6 in. by 8 ft.=1,000 cubic feet; divided by 60 cubic feet to the ton, it should contain about 17 tons, but it should be clearly understood that this is only an approximation depending entirely on the above conditions.”

ROUP IN FOWLS.

In reply to a correspondent who asked for advice on a disease of the eyes amongst his fowls and paralysis in their joints, Mr. J. Beard, Instructor in Poultry Management, Department of Agriculture and Stock, stated that in the first instance the birds were affected with roup, which, if not checked, would spread through the whole flock; and he recommended, as a cure and prevention, the addition of one tablespoonful of kerosene to half a kerosene tin full of water twice a week until a cure was effected, until which, all badly affected birds were to be removed to a dry, warm place, and their heads washed thoroughly daily with a weak solution of boracic acid and warm water, using pressure on the nostrils, and with a feather clean all the mucous out of the upper mandible inside the mouth. When dried, paint the nostrils and cleft with a feather dipped in kerosene and repeat until a cure is effected. For all birds that are badly affected, use of the axe is the best cure. Disinfect the houses with a strong liquid disinfectant.

The paralysis of the fowls may be caused by exposure to cold and wet and damp ground. If a cure is effected, these birds should never be bred from.

Treatment.—Remove the cause, isolate the birds, and give warm bedding, together with plenty of green food. Rub the affected parts with 1 part of turpentine and 3 parts of olive oil, or rub the joints with belladonna liniment, adding 10 grains each of iodide of potassium and salicylate of soda to each half-pint of drinking water. Give no meat of any kind.

SOUTHERN FRUIT MARKETS.

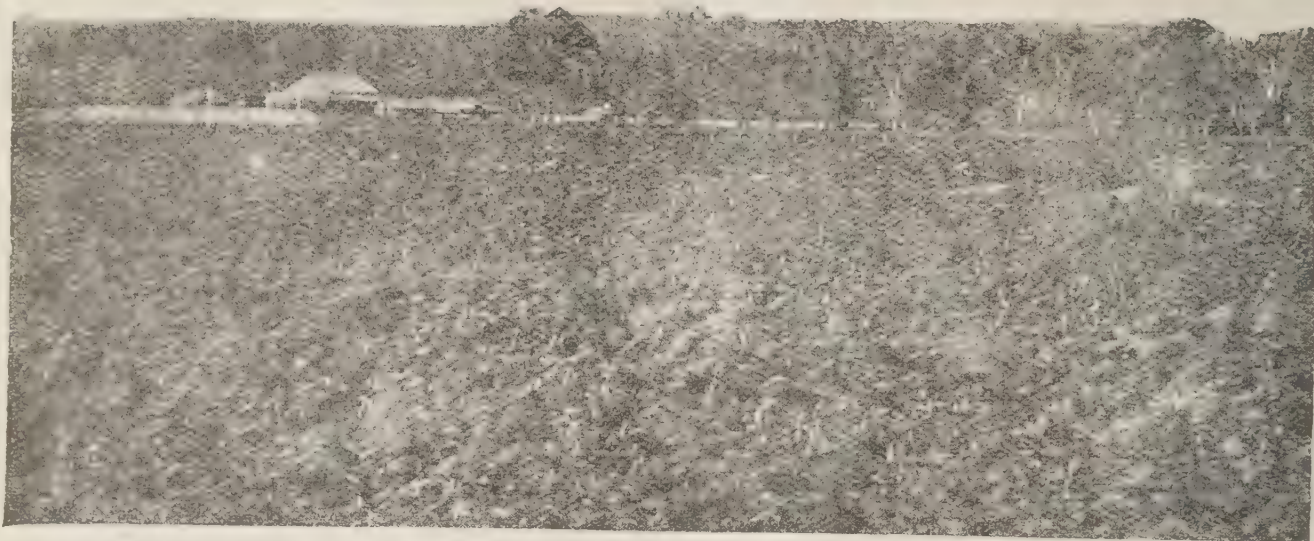
Article.	AUGUST.				
	Prices.				
Bananas (Tweed River), per double case	25s. to 32s.
Bananas (Queensland), per double case...	25s. to 30s.
Bananas (Fiji), per double case
Lemons, per bushel case	3s. to 5s.
Mandarins, per bushel case	2s. 6d. to 9s.
Oranges (common), per bushel case	6s. to 8s.
Oranges (Navel), per bushel case	12s. to 14s.
Passion Fruit, per bushel case	10s. to 15s.
Pineapples (Queens), per double case	13s. to 25s.
Pineapples (Ripley), per double case	13s. to 25s.
Pineapples (common), per dozen
Tomatoes, per quarter case

PRICES OF FRUIT—TURBOT STREET MARKETS.

Apples, Eating, per half bushel case	...	...	...	...	12s. 6d. to 15s. 6d.
Apples, Cooking, per bushel case	...	...	...	...	9s. to 14s.
Bananas (Cavendish), per dozen	...	...	...	...	4d. to 11d.
Bananas (Sugar), per dozen	...	...	...	...	4d. to 6½d.
Cape Gooseberries, per quarter case	...	...	...	...	12s. to 14s.
Citrons, per cwt.	...	...	...	...	14s. to 15s.
Cocoanuts, per sack	...	...	...	...	£1 5s.
Cumquats, per quarter case	...	...	...	...	5s. to 6s. 6d.
Custard Apples, per tray	...	...	...	...	2s. 6d. to 3s. 6d.
Custard Apples, per half bushel case	...	...	...	...	3s. to 5s. 6d.
Gooseberries, per quart	...	...	...	...	...
Lemons (Lisbon), per half bushel case	...	...	...	...	11s.
Mandarins, per case	...	...	...	...	8s. to 20s.
Oranges (Seville), per cwt.	...	...	...	...	16s.
Oranges (special), per case	...	...	...	...	12s. to 15s.
Oranges (second crop), per case	...	...	...	...	5s. to 6s.
Papaw Apples, per quarter case	...	...	...	...	2s. 6d. to 5s. 6d.
Passion Fruit, per half bushel case	...	...	...	...	8s. 6d. to 14s.
Pineapples (smooth), per case	...	...	...	...	5s. to 8s.
Pineapples (rough), per dozen	...	...	...	...	1s. to 3s. 6d.
Strawberries, per dozen boxes	...	...	...	...	4s. 6d. to 12s.
Strawberries, per tray	...	...	...	...	2s. 6d. to 3s.
Tomatoes, per quarter case	...	...	...	...	7s. to 15s.

TOP PRICES, ENOGGERA YARDS, JULY, 1920.

Animal.	JULY.				
	Prices.				
Bullocks	£22 to £24 10s.
Cows	£16 2s. 6d. to £18 5s.
Merino Wethers	51s.
Crossbred Wethers	60s. 6d.
Merino Ewes	35s. 6d.
Crossbred Ewes	46s. 6d.
Lambs	40s. 9d.
Pigs	101s.



A Field of Giant Kangaroo Rape.

Giant Kangaroo Rape, The Food for Sheep!

A VALUABLE WINTER CROP for pasturing Sheep—will fatten three more to the acre than any other variety. Easily cultivated. Strong rapid grower, producing an abundance of highly nutritious green feed, greatly relished by all stock; a long strong taproot enables it to stand long periods of drought. Sow 4 to 6 lbs. per acre in drills, or 8 to 12 lbs. per acre broadcast.

Now Available for Immediate Delivery.
1/6 lb.; 150/- cwt. f.o.b. Melbourne.

"Mortgage Lifter" Oat, A Wonderful New Variety.

"MORTGAGE LIFTER" grows to a height of 6 feet, and has yielded from 90 to 100 bushels to the acre. It is also considered a good hay oat. One grower reports very satisfactory results, obtaining 61 bushels, in spite of a very dry season.

Graded, re-machined, clipped, and tailed,
10/- bushel; 9/6 bushel in sack lots;
9/- bushel in 5 sack lots.

Special Fodder Circulars Post Free on request.

LAW, SOMNER Pty. Ltd.,

BRITISH AND COLONIAL SEED MERCHANTS,

139-141 Swanston Street, MELBOURNE, VICTORIA.

Established 1850.

Farm and Garden Notes for October.

FIELD.—Under ordinary favourable conditions, harvesting the wheat and barley crops may now begin. Those who have oats for hay should cut it when the grain has formed, but before it is ripe, for then the plant is in its most nourishing condition. Destroy caterpillars on tobacco plants, and top the latter so as to throw all the strength into the leaves. Keep down the weeds, which will now try to make headway; earth up any growing crops requiring the operation; sow maize, imphee, setaria, kafir corn, teosinte, sorghum, &c. Plant sweet potatoes, sisal hemp, yams, peanuts, and ginger.

KITCHEN GARDEN.—Why do so few gardeners and farmers grow their own vegetables? This is a question frequently asked by visitors to the farming districts. The reason probably is, that vegetables require a good deal of care and attention, which means also a good deal of time taken from the ordinary farm work. In many cases it pays the farmer better to buy many kinds of vegetables than to grow them himself. The only vegetable grown on many fine farms are cabbages and rumpkins, not to class potatoes under the head. Many people have an idea that European vegetables cannot be grown during the hot summer months, but this is a great fallacy; the Chinese gardeners supply the towns with all kinds of vegetables, except, perhaps, cauliflowers, during the whole of the summer. It is, therefore, clear that, by constant work, plenty of manure, water, and some shade for seedlings, most vegetables can be produced during the hot months from November to March. If your ground has been trenched or deeply dug and well worked, the advantages will be seen during the coming months. It does not pay to work shallow-dug ground. When sowing and planting during this month, give plenty of room between the rows and the plants; otherwise they will be drawn up and worthless, and keep the ground open by constant forking and hoeing. Thin out melon and cucumber plants. It is a good plan to peg down the vines; they will then not be blown about by the wind; they will take root at intervals, and thus help the main stalk. Give plenty of water to tomatoes planted out last month. They should also be mulched. Sow cabbage, French beans, melons, lettuce, radishes, pumpkins, cucumbers, marrows, rosellas, &c.; and transplant for succession in calm, cloudy weather.

FLOWER GARDEN.—Stake any dahlias which may be now above ground, and plant out the bulbs which were stored in a moist place. If the weaker bulbs are reserved, they will come in for autumn planting. Take up all bulbs which have done flowering, and store them in a dry place. Winter-flowering plants will have gone off almost; still, the garden should be in full bloom, and will well repay the trouble bestowed on it, and a little fertiliser given as a top-dressing will assist the plants to bloom and look well for a longer time than if they were neglected. Give weak liquid manure to chrysanthemums, and allow no suckers to grow till the plants have done flowering. Take up narcissi. Do not store them, but plant them at once in new situations. Sow antirrhinum, balsam, zinnia, summer chrysanthemum, calliopsis, and nemophila.

Orchard Notes for October.

THE SOUTHERN COAST DISTRICTS.

November is somewhat of an off month for fruit, as the crop of strawberries is about over; pineapples, with the exception of a few off-season fruit, are not ready for marketing; and citrus fruits of all sorts, with the exception of those grown in the latest districts, are now over. Bananas should, however, be improving, particularly if the season is favourable.

The most important work of the month is the cultivation of the orchard, as, in order to retain moisture in the soil, it is essential that the soil be kept in a fine state of tilth. Where land is liable to wash, breaks should be left between the fine-worked land, or, even better, a good break of cowpea or other leguminous crop,

valuable for producing nitrogen and humus, should be grown. All fruit pests should be attended to; cyaniding can be carried out where necessary, and is especially useful now in the case of the Red, Purple, Mussel, Circular Black, and Glover Scales. Fruit-fly should be systematically fought; all infested plums, peaches, guavas, or other fruits should be gathered and destroyed, so as to prevent the spread of the pest. Sucking bugs of all sorts should be gathered and destroyed, the egg-clusters, as well as the immature and mature insects, being destroyed. Hand-gathering is as good a plan as any. Fig beetles should be destroyed by spraying with Kedzie's mixture; and the egg-clusters should be destroyed whenever found.

Bananas and pineapples can be planted during the month, taking care, in the case of the pineapples, not to set out suckers that will immediately throw out a fruit, but those that will become firmly established before they fruit. Examine the vineyard carefully, and keep it well worked. Look out for Oidium and Black Spot, and treat for same as recommended in the Orchard Notes of the two previous months.

Early ripening grapes will be reaching maturity towards the end of the month; but few, if any, will be ripe. In any case do not market too immature fruit; rather wait a few days longer, till it is fit to eat.

THE TROPICAL COAST DISTRICTS.

The main crop of pineapples will ripen during the month; and if gathered at the right time—viz., when fully developed, but not turned colour—they will carry all right South, if carefully handled and well packed. Papaws and granadillas are still in season, and will meet with a good Southern demand; they must be packed in cases containing only a single layer of fruit, and should be sent in the cool chamber. I am certain that a good market can be got for these fruits in both Melbourne and Sydney, particularly at this time of year, when their winter fruits are off and their summer fruits are not yet on.

Watch bananas carefully for fly. Keep the orchards well cultivated.

Only ship good mangoes South; far too much rubbish is sent to Brisbane. Good mangoes will pay to pack properly, but the common sorts, which predominate to an enormous extent, will barely pay freight, if there is a good crop. The canning of good types of fibreless mangoes of good flavour is well worth taking up commercially in the North, as a ready sale for the canned fruits can be obtained.

As in the Southern Coast districts, all fruit pests should be systematically fought, and the orchard should be kept in a good state of tilth, as, once the wet season starts, there is little chance of cleaning up weeds and rubbish of all kinds, or of cultivating and sweetening soil.

THE SOUTHERN AND CENTRAL TABLELANDS.

The earlier kinds of summer fruits, such as cherries, will ripen during the month. See that, if the fruit-fly makes its appearance, it is systematically fought.

Look out for Codling Moth, and continue the sprayings with Kedzie's mixture.

Look out carefully for any San José Scale that may have escaped the winter spraying, as, if the trees are sprayed whilst the young are hatching out, the bulk of the insects are killed and little damage is done either to the trees or fruit.

The sulphide of soda spray is one of the best to use now. Keep Woolly Aphis in check, should it make its appearance, using the resin washes; or, if it and San José Scale are both present, use the sulphide of soda spray.

Watch the vineyards carefully for Black Spot and Oidium. Keep the orchard and vineyard well cultivated, so as to retain all the moisture in the soil required for the growth of the tree and development of the fruit. In the warmer parts, irrigate when necessary, following the irrigation by deep and systematic cultivation.

See that grape vines have plenty of foliage to protect the ripening fruit from sun scald, but yet not so dense a foliage as to induce Oidium or Black Spot. Look out for Red Scale on citrus trees, and cyanide to check same. Look out for fruit-fly in the early-ripening fruits, and gather and destroy all that may be so affected.

RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF JULY IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALLS DURING JULY, 1920 AND 1919, FOR COMPARISON.

Divisions and Stations.	AVERAGE RAINFALL.		TOTAL RAINFALL.		Divisions and Stations.	AVERAGE RAINFALL.		TOTAL RAINFALL.	
	July.	No. of Years' Records.	July, 1920.	July, 1919.		July.	No. of Years' Records.	July, 1920.	July, 1919.
<i>North Coast.</i>					<i>South Coast—continued:</i>				
	In.		In.	In.		In.		In.	In.
Atherton ...	0·88	19	1·04	0·66	Nambour ...	2·56	24	2·72	1·65
Cairns ...	1·59	38	2·32	3·01	Nanango ...	1·68	38	3·13	0·12
Cardwell ...	1·40	48	3·25	0·16	Rockhampton ...	1·39	33	0·83	Nil
Cooktown ...	0·99	44	1·31	0·87	Woodford ...	2·45	33	1·99	0·58
Herberton ...	0·63	33	0·88	0·49					
Ingham ...	1·49	28	3·81	0·09					
Innisfail ...	4·25	39	7·89	4·46					
Mossman ...	1·43	12	3·68	1·17					
Townsville ...	0·53	49	0·27	0·02					
<i>Central Coast.</i>					<i>Darling Downs.</i>				
Ayr ...	0·53	33	0·42	Nil	Dalby ...	1·76	50	3·36	0·08
Bowen ...	0·91	49	1·17	Nil	Emu Vale ...	1·35	24	3·45	0·23
Charters Towers ...	0·53	38	0·37	Nil	Jimbour ...	1·65	32	3·46	0·11
Mackay ...	1·61	49	0·93	0·44	Miles ...	1·74	35	3·67	0·18
Proserpine ...	1·02	17	1·44	0·58	Stanthorpe ...	1·91	47	3·11	0·27
St. Lawrence ...	1·21	49	0·80	Nil	Toowoomba ...	1·95	48	4·03	0·27
					Warwick ...	1·71	33	3·73	0·13
<i>South Coast.</i>					<i>Maranoa.</i>				
Biggenden ...	1·23	21	1·59	0·22	Roma ...	1·37	46	3·24	Nil
Bundaberg ...	1·89	37	1·87	Nil					
Brisbane ...	2·22	69	2·19	0·18					
Childers ...	1·59	25	1·49	0·03					
Crohamhurst ...	2·92	25	2·60	1·35					
Esk ...	1·88	33	3·76	0·14					
Gayndah ...	1·47	49	1·18	0·04					
Gympie ...	2·11	50	1·97	0·38					
Glasshouse M'tains	2·05	12	2·47	0·68					
Kilkivan ...	1·70	41	1·32	0·24					
Maryborough ...	1·93	49	1·58	0·30					
					<i>State Farms, &c.</i>				
					Bungeworgorai ...	0·83	6	3·03	Nil
					Gatton College ...	1·26	21	2·55	0·04
					Gindie ...	1·05	21	1·23	Nil
					Hermitage ...	1·32	14	4·07	0·12
					Kairi ...	0·99	6	1·78	1·52
					Sugar Experiment Station, Mackay	1·30	23	0·82	0·59
					Warren ...	0·64	6	0·91	Nil

NOTE.—The averages have been compiled from official data during the periods indicated; but the totals for July this year, and for the same period of 1919, having been compiled from telegraphic reports are subject to revision.

GEORGE G. BOND, State Meteorologist.

ASTRONOMICAL DATA FOR QUEENSLAND.

TIMES COMPUTED BY D. EGLINTON, F.R.A.S.

TIMES OF SUNRISE AND SUNSET.
AT BRISBANE.

1920.	SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		PHASES OF THE MOON, ECLIPSES, &c. (The times stated are for Queensland, New South Wales, and Victoria). H. M. 6 Sept. ☾ Last Quarter 5 5 a.m. 12 „ ☉ New Moon 10 52 p.m. 20 „ ☾ First Quarter 2 55 p.m. 28 „ ☉ Full Moon 11 57 a.m. Perigee on 9th at 8.12 a.m. Apogee on 21st at 8.42 a.m. 5 Oct. ☾ Last Quarter 10 54 a.m. 12 „ ☉ New Moon 10 50 a.m. 20 „ ☾ First Quarter 10 30 a.m. 28 „ ☉ Full Moon 12 9 a.m. Perigee on 4th at 7.54 p.m. and 31st at 12.26 a.m. Apogee on 19th at 4.42 a.m. A Total Eclipse of the Moon will occur on the night of the 27th, commencing about 11 30. An hour earlier it will be entering the dark shadow of the earth. 3 Nov. ☾ Last Quarter 5 35 p.m. 11 „ ☉ New Moon 2 5 a.m. 19 „ ☾ First Quarter 6 13 a.m. 26 „ ☉ Full Moon 11 42 a.m. Apogee on 16th at 12.18 a.m. Perigee on 27th at midnight. The Moon will cause a partial eclipse of the Sun during the night of the 10th, visible only on the other side of the world, including Great Britain and Ireland. 3 Dec. ☾ Last Quarter 2 29 a.m. 10 „ ☉ New Moon 8 4 p.m. 19 „ ☾ First Quarter 12 40 a.m. 25 „ ☉ Full Moon 10 39 p.m. Apogee on 13th at 3.30 p.m. Perigee on 26th at 10.24 a.m.
Date.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.	
1	6.1	5.35	5.29	5.47	4.59	6.5	4.46	6.28	
2	6.0	5.35	5.28	5.48	4.58	6.6	4.46	6.29	
3	5.59	5.36	5.27	5.49	4.57	6.6	4.46	6.30	
4	5.58	5.36	5.26	5.49	4.57	6.7	4.46	6.31	
5	5.57	5.37	5.24	5.50	4.56	6.8	4.46	6.32	
6	5.56	5.37	5.23	5.50	4.55	6.9	4.46	6.33	
7	5.55	5.37	5.22	5.50	4.55	6.9	4.46	6.33	
8	5.54	5.37	5.21	5.51	4.54	6.10	4.47	6.34	
9	5.53	5.38	5.20	5.51	4.53	6.10	4.47	6.34	
10	5.52	5.38	5.19	5.51	4.52	6.11	4.47	6.35	
11	5.50	5.38	5.17	5.52	4.52	6.12	4.47	6.35	
12	5.49	5.39	5.16	5.52	4.51	6.13	4.48	6.36	
13	5.48	5.39	5.15	5.53	4.51	6.14	4.48	6.36	
14	5.47	5.40	5.14	5.54	4.50	6.15	4.48	6.37	
15	5.46	5.40	5.13	5.55	4.50	6.16	4.49	6.37	
16	5.45	5.41	5.12	5.55	4.49	6.17	4.49	6.38	
17	5.44	5.41	5.11	5.56	4.49	6.18	4.49	6.38	
18	5.43	5.42	5.10	5.56	4.48	6.18	4.50	6.39	
19	5.42	5.42	5.9	5.57	4.48	6.19	4.50	6.39	
20	5.41	5.43	5.8	5.58	4.48	6.20	4.50	6.40	
21	5.40	5.43	5.7	5.59	4.48	6.21	4.51	6.40	
22	5.39	5.43	5.6	5.59	4.48	6.21	4.51	6.41	
23	5.38	5.44	5.5	6.0	4.48	6.22	4.52	6.41	
24	5.37	5.44	5.4	6.0	4.47	6.22	4.52	6.42	
25	5.36	5.44	5.4	6.1	4.47	6.23	4.53	6.43	
26	5.34	5.45	5.3	6.1	4.47	6.24	4.53	6.43	
27	5.33	5.45	5.2	6.2	4.47	6.24	4.54	6.44	
28	5.32	5.45	5.1	6.2	4.47	6.25	4.54	6.44	
29	5.31	5.46	5.0	6.3	4.47	6.26	4.55	6.45	
30	5.30	5.46	5.0	6.3	4.47	6.27	4.56	6.45	
31	...	...	4.59	6.4	...	...	4.57	6.45	

For places west of Brisbane, but nearly on the same parallel of latitude—27½ degrees S.—add 4 minutes for each degree of longitude. For example, at Toowoomba the sun would rise about 4 minutes later than at Brisbane if it were not for its higher elevation, and at Oontoo (longitude 141 degrees E.) about 48 minutes later.

At St. George, Cunnamulla, and Thargomindah the times of sunrise and sunset will be about 18 m., 30 m., and 38 minutes respectively, later than at Brisbane.

At Roma the times of sunrise and sunset may be roughly arrived at by adding 16 minutes to those given for Brisbane, but an allowance of 3 or 4 minutes more is sometimes necessary.

The moonlight nights for each month can best be ascertained by noticing the dates when the moon will be in the first quarter and when full. In the latter case the moon will rise somewhat about the time the sun sets, and the moonlight then extends all through the night; when at the first quarter the moon rises somewhere about six hours before the sun sets, and it is moonlight only till about midnight. After full moon it will be later each evening before it rises, and when in the last quarter it will not generally rise till after midnight.

It must be remembered that the times referred to are only roughly approximate, as the relative positions of the sun and moon vary considerably.

[All the particulars on this page were computed for this Journal, and should not be reproduced without acknowledgment.]

THE OPEN DOOR *via* BRADSHAW'S

There is a good position waiting for every boy and girl who will qualify. In the office and store, in every field where commercial training is necessary there is room for *you*.

Are you able to get one of these well-paid positions?

THE WAY TO YOUR SUCCESS

Bradshaw's 26 : 6 : 26 Shorthand—the speedy way to shorthand efficiency in five simple lessons. **YOU** will be able to write at high speed in a few weeks.

Typewriting dovetails with Shorthand and is the basis of office practice. So much is done on the typewriter to-day that a knowledge of Shorthand and Typewriting is indispensable.

Bookkeeping and Business practice are so much a part of the day's work in every business, that these subjects are taught in a most practical way. The beginner commences at Bradshaw's with assets worth £1000—we show him how to take care of them.

Handwriting: "Apply in own handwriting." How often have you noticed that term in an advertisement? Suppose your qualifications were judged by the handwriting of your application—would you get the job? Leave nothing to chance. You can be taught to write a good hand at Bradshaw's.

The demand to-day is for trained boys and girls—not merely taught to use a typewriter and write in symbols—but trained in office efficiency—with a practical knowledge of the actual requirements of business men.

A Bradshaw training involves the test of practical experience.

Can You Sell? You can become a trained Salesman. The art of selling is to create the right desire on the part of the buyer. When a sale is complete it is satisfactory only when all concerned are pleased.

In order to become a successful salesman you need to understand and appreciate the emotions, prejudices, and tastes of the buying public.

This interesting and vital phase of business rings with an appeal to the boy who wants to become a live business man.

You can learn Salesmanship through us and particularly the kind of Salesmanship you require—General, Wholesale, Retail, and Speciality Selling.

Boys and Girls who wish to become drapers will find that our course in Technical Drapery will not only equip them with a knowledge of the drapery trade, but they will be able to commence at second and third year wages instead of first—with the crowd.

Accountant
Architect
Auditor
Advertising Manager
Bookkeeper
Business Manager
Bank Clerk
Chemist
Draper
Draftsman
Engineer
Journalist
Mail Order Merchant
Municipal Clerk
Municipal Engineer
Military Staff Clerk
Naval Staff Clerk

Nurse
Private Secretary
Public Servant
Paymaster (Naval)
Reporter
Stenographer
Salesman
Shop Assistant
Shop Manager
Show Card Writer
Surveyor
Telephonist
Telegraphist
Teacher
University Graduate
Wireless Operator

MAIL COUPON

To-day



Send by
return post
particulars

of.....

Name.....

Address.....

BRADSHAW'S BUSINESS COLLEGE

Pty. Ltd.

240-50 Flinders St., Melbourne

GLYCERINE FROM SUGAR.

GERMAN AND AMERICAN DISCOVERIES.

At a meeting of the Royal Society of New South Wales recently, Dr. R. Greig-Smith stated that the recent discoveries of the economic chemist showed how the molasses output of sugar mills could be turned to profitable account. It was explained that when the blockade began to be felt, and the supply of fats and oils was stopped, Germany was faced with the fact that she must get glycerine somehow. It is produced during the fermentation of wine and beer, though in small amount; the most that is found in the richest wines is about 3 per cent.

But it occurred to the Germans that this might be increased, and experiments showed that by altering the method of fermentation and permitting it to proceed in the presence of sulphite, the quantity of glycerine could be greatly improved. Further work showed that 20 per cent. of the sugar could be changed to glycerine, and this led to the establishment of many factories with the result that the output reached 1,000 tons monthly.

Upon the American Government learning that glycerine was being made by a fermentation process, it instructed several institutions to investigate the problem. In three months a method had been devised which was subsequently found to differ slightly from the German process, inasmuch as soda ash was employed in place of sulphite. Using molasses as a source of sugar, the American investigators were able to get one-quarter of the sugar fermented to glycerine, and to recover one-half of this, so that from five and a-half to six lb. of dynamite glycerine were got from one cwt. of inedible molasses. It was considered that the alcohol which is also obtained would pay the most of the manufacturing expenses, leaving the glycerine to pay for its own separation from the fermented slop.—*South African Sugar Journal*.

TO PICKLE ONIONS.

Endeavour to obtain an even-sized lot. See that they are perfectly dry. Throw out all growing ones. Do not scald to take off the skins, but peel dry. As the onions are peeled put them into a large bowl (earthenware or enamelled; not tin). When the bottom is covered, sprinkle with salt, and as layer succeeds layer again sprinkle with salt, so that when the bowl is full the covering is salt. Let it stand in a cool place for twenty-four hours, then stir (with a wooden spoon) and sprinkle more salt. Again let it stand for twenty-four hours and sprinkle salt once more. After the lapse of another twenty-four hours drain away the brine. Wipe every onion dry, lay out on a cloth in the sun for two hours, then put in bottles or jars. To each half gallon of brown vinegar add a handful of whole pepper, four or five cloves of ginger, bruised, two or three blades of mace, and about twenty cloves; place on the fire in a perfectly clean stewpan. Be sure this has no particle of grease about it. Bring to the boil. Take off the fire and let it stand until stone cold, then pour over the onions, leaving all the spice in the stewpan. Stand the bottles in a cool place for two days, each bottle covered with a piece of cardboard. At the end of that time return all the vinegar to the spice and bring to the boil again, repeating this twice at intervals of two days. On the last occasion add to the vinegar as many red peppers as desired. Finally fill up the bottles with a proportion of spice to each one, and on the top of all a few scrapings of horseradish. Cover with bladder or in any way to make the bottles airtight, and stand away in a cool cupboard for use in about five or six weeks, labelling the date of bottling. When removing any of the pickles close the bottle securely again. Never use a metal fork or spoon for the extraction of the pickles. A sharp-pointed wooden skewer is as good as anything.—*Farm, West Australia*.

PICKLED RED CABBAGE.

Ingredients.—Red cabbages, salt and water to each quart of vinegar, $\frac{1}{2}$ oz. ginger well bruised, 1 oz. whole black pepper, and when liked a little cayenne.

Mode.—Take off outside decayed leaves of a nice red cabbage, cut it in quarters, remove the stalks, and cut it across in very thin slices. Lay these on a dish, strew them plentifully with salt, and cover them with another dish. Let stand twenty-four hours, turn into a colander to drain, and if necessary, wipe lightly with a clean, soft cloth. Put them in a jar, boil up the vinegar with spices in the above proportions, and when cold pour it over the cabbage. It will be fit for use in a week or two. Tie down with bladder and keep in a dry place.

Queensland.

Department of Agriculture and Stock.

Volume XIV.



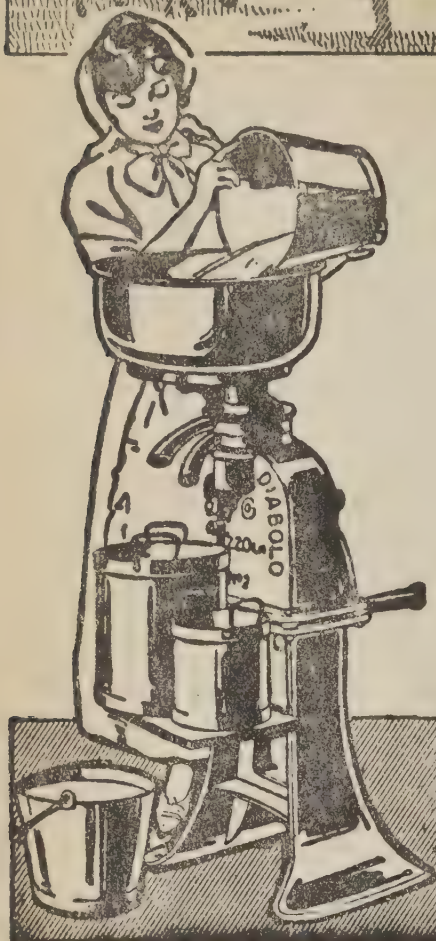
OCTOBER, 1920.

Queensland Agricultural Journal.



REGISTERED AT THE GENERAL POST OFFICE, BRISBANE,
FOR TRANSMISSION BY POST AS A NEWSPAPER.

Edited by
A. J. BOYD, F.R.G.S.Q.



You want a Separator

that will work to your full satisfaction every day all the year round, being simple in construction, skimming so clean that no butterfat is left in the skim milk, easy to clean and running so lightly and being so easy to work that a little child can manipulate it. If you wish to get the Best, Simplest, and most Durable Separator choose the

Diabolo Separator

Get one on a month's free trial.

DIABOLO
CREAM SEPARATOR CO.
138-140 CREEK ST BRISBANE

SEEDS !

THERE is satisfaction in sowing seeds that will give abundant crops. This is what you want, is it not? Then sow **TAYLOR'S SEEDS**. Success in Farming is influenced by many factors such as weather, soil, method of cultivation, etc., but **PURE SEED** is the first rung on the ladder of success on the farm.

BIGGER CORN CROPS

are assured if you plant **TAYLOR'S SEED MAIZE**. Our New Season's stock of Seed Maize has just arrived, and includes all the leading varieties. Can we quote you? All samples are of good germinating quality.

FODDER CROP SEEDS.

For present planting we have Imphee, Panicum, Amber Cane, Sorghum, Japanese Millet, Rhodes Grass, Paspalum, Couch Grass, and last, but by no means least,

SUDAN GRASS SEED.

If you live in a dry district you really cannot afford to be without **Sudan**, as its drought-resisting qualities are well proved. It is also a prolific yielder, and a nutritious food for all kinds of stock.

We also have good stocks of **VEGETABLE AND FLOWER SEEDS** of all kinds—for the farm, flower garden, and vegetable garden. Sold in packets, from 3d. each upwards, also in bulk.

CHAS. TAYLOR & CO.,

"The Leading Seedsmen,"

—124-130 ROMA STREET, BRISBANE.—

VOL. XIV., PART 4.]

[OCTOBER, 1920.]

Registered at the General Post Office for Transmission by Post as a Newspaper.]



THE
QUEENSLAND AGRICULTURAL JOURNAL

ISSUED BY DIRECTION OF

THE HON. THE SECRETARY FOR AGRICULTURE.

EDITED BY A. J. BOYD F.R.G.S.Q.

VOL. XIV. PART 4.

OCTOBER.

By Authority:

ANTHONY JAMES CUMMING, GOVERNMENT PRINTER, BRISBANE

1920

We are Bag Specialists

For Farmers For Farmers For Farmers

Bags for Wheat, Maize, Chaff, Peas, Beans, etc.
Any sort or kind. New or Second Hand.

**For Storekeepers, Meat Exporters, Flour
———Millers, Bacon Curers, etc.———**

All kinds of HESSIAN and CALICO BAGS
———Printed to your own design.———

For Packing, Signwriting, Plastering, etc.
HESSIAN & CALICO all widths & grades.

Joyce Bros. (Q.) Limited,
Stanley Street, South Brisbane.

ASTER PLANTS

(Giant Crego and Tasmanian Branching),

WE now have seedlings of the beautiful Giant Crego Aster, and also seedlings of the Tasmanian Branching Type. At **6d.** dozen these seedlings are excellent value. They produce glorious blooms. For those who prefer to raise their own seedlings from our seed, we can supply Tasmanian Branching (mixed) at **6d.** packet, or six packets for **2/6**. Giant Crego (mixed and distinct colours) **1/-** packet; six packets for **5/-**.

JAPANESE CHRYSANTHEMUMS

(Incurved and Recurved Varieties).

Choice-named varieties at **10/-** dozen, post free. Let us select a dozen beauties for you.

SINGLE CHRYSANTHEMUMS.

We are now offering a distinct strain of Dwarf Single Chrysanthemums, of sturdy habit, carry flowers five inches in diameter. A wide range of colours is available. Remember, Dwarf Single Chrysanthemums do not require stakes or support. Eminently suitable for Show or Decorative purposes.

DAHLIAS.

Do you like a bright, showy garden? You could not do better than to plant out a few Dahlias to obtain this effect. With a moderate amount of care, Dahlias will reward you with a display of beautiful hardy blooms. We can supply your needs from a healthy stock. Cactus, Decorative, Pompom, Paeony, from **10/-** to **15/-** dozen, according to variety.

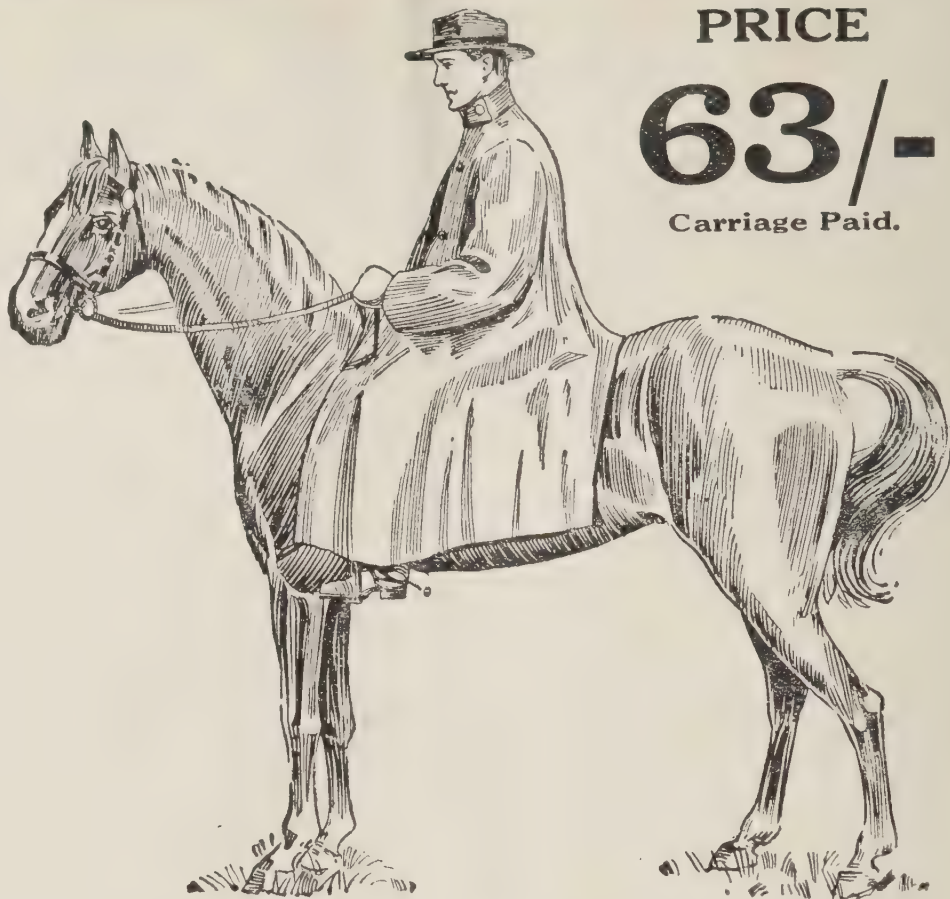
H. A. PETERSEN LTD.,

Seedsman and Nurseryman,

George St., and 244 Queen St., Brisbane.

CONTENTS.

	PAGE.		PAGE.
AGRICULTURE—		ENTOMOLOGY—	
Corn-growing Competition	165	Cane Grub Investigation	193
Juvenile Corn-growing Competition	167	GENERAL NOTES—	
Encouragement to Coffee Growers ...	169	A Remarkable Rubber Discovery ...	200
Grain for Sale	170	Societies, Show Dates, &c.	200
		The Production of Mint for its	
		Oil (A. J. Pinn)	200
PASTORAL—		ANSWERS TO CORRESPONDENTS—	
Farmers' Sheep on Coastal Lands		Paper Money	201
(R. C. Wilson)	171	Construction of Sundial	201
Some Record Prices for Stock ...	173		
Great Average for Pigs	173		
DAIRYING—		SUGAR AND ALCOHOL FROM THE NIPAH	
Profits on Pig-raising	173	PALM	202
POULTRY—		RAINFALL IN THE AGRICULTURAL DISTRICTS 203	
Report on Egg-laying Competition,		THE MARKETS—	
Queensland Agricultural College,		Prices of Farm Produce in the	
August, 1920	174	Brisbane Markets for September,	
Final Report of the Sixteenth Egg-		1920	204
laying Competition, Queensland		Vegetables—Turbot Street Markets	204
Agricultural College—Part 2 ...	177	Southern Fruit Markets	205
		Prices of Fruit—Turbot Street	
		Markets	205
		Top Prices, Enoggera Yards,	
		August, 1920	205
QUEENSLAND PRICES CURRENT IN 1895 ...	180	ORCHARD NOTES FOR NOVEMBER	207
TROPICAL INDUSTRIES—		FARM AND GARDEN NOTES FOR NOVEMBER	208
The Northern Sugar Plantations ...	181	SEED TESTING	209
The Sugar Crop of 1920	182	ASTRONOMICAL DATA FOR QUEENSLAND ...	210
"Bunchy Top" in Bananas	182	RECORD PRICES FOR STOCK	212
The Spacing of Cotton	183	SUNFLOWER SILAGE	212
Neglected Industries—		DEPARTMENTAL ANNOUNCEMENTS	XVII.
Rice and Coffee	184		
Coffee in Queensland	191		
BOTANY—			
Illustrated Notes on the Weeds of			
Queensland (C. T. White, F.L.S.)	196		



PRICE

63/-

Carriage Paid.

Of Country-Wide Fame!

The
Ever Ready,
Ever
Reliable

“JACKEROO”

RAIN COAT

There is no other Rain Coat quite like the **“JACKEROO”**—or nearly so good for the money.

An All-purpose Coat that is worth more shillings than the shillings you are asked to pay—and there is

—**“A Twelve Months' Guarantee.”**—

Material is in FAWN colour. Strong DOUBLE TEXTURE Mackintosh, having layer of RUBBER between the two layers of cloth, thus rendering it absolutely waterproof.

IDEALLY SUITED FOR RIDING, DRIVING, or WALKING. The **“JACKEROO”** has V-piece fitted at back to cover back of saddle, but for walking purposes this can be buttoned and CONVENIENTLY closed up.

Price **63/-**

PIKE
BRISBANE

BROTHERS
LIMITED

TOWNSVILLE
TOOWOOMBA

QUEENSLAND AGRICULTURAL JOURNAL

Vol. XIV.

OCTOBER, 1920.

PART 4.

Agriculture.

CORNGROWING COMPETITION.

When the Department of Agriculture decided, in 1914, to institute annual corn-growing competitions for farmers' sons and daughters under the age of 18, the response was most creditable to the lads and lasses on the land. Since the first competition, there has been an increasing number of competitors amongst the young aspiring farmers. The conditions stipulated that no assistance should be rendered to any competitor beyond the driving of horses if necessary. The entire work from preparation of the land to harvesting the crop must be done by each contestant. At the last competition it will be seen that the producer of the highest average maize crop was a young girl only 13½ years old. Her plot, entirely self-managed, yielded at the rate of 150 bushels of grain per acre.

The conditions of the competition to be held for 1920-21 are as follows:—

1. This competition will be open to all under the age of eighteen years who are residents of the State of Queensland. An entrance fee of 2s. 6d. must be forwarded to the Under Secretary with the application to enter.

2. Applications to be enrolled in the competition, containing the following particulars, must be forwarded to the Under Secretary, Department of Agriculture and Stock, Brisbane, to reach him, if possible, not later than 20th October:—

(a) Full name and address. (Give Christian names in full.)

(b) Date of birth. (Day, month, and year.)

(c) No. of Division in which applicant resides, and the name of the Dairy Inspector who supervises the locality.

3. The area to be devoted to the planting of the seed maize shall be one-tenth of an acre, selected seed for which, 1¼ lb. of Improved Yellow Dent, will be posted, free of cost.

4. Each competitor shall have absolute freedom in his choice of ground, and in the methods he may adopt in preparing, planting, and cultivating his plot; the plot not to exceed one-tenth of an acre. Yields will be calculated, when judging, on the basis of this area.

The following table shows the length the rows must be to give the exact area according as four, five, six or more rows are planted:—

No. of Rows Four Feet apart.	Length of Rows in Feet.	No. of Rows Four Feet apart.	Length of Rows in Feet.
4	272 ft. 3 in.	8	136 ft. 1½ in.
5	217 ft. 10 in.	12	90 ft. 9 in.
6	181 ft. 6 in.	16	68 ft. 0 in.
7	155 ft. 7 in.	..	..

5. Each competitor will be required to keep a record chart showing the dates and particulars of the different stages of work, and these charts must be delivered, at the time of harvesting, to the officer appointed for superintending and verifying the yield, and this officer will post them on to Brisbane.

6. Within seven days from the verification of the yield from the crop, each competitor shall select, without aid from other persons, twelve uniform cobs of the maize from his crop, and forward them, with a letter of advice, to the Department of Agriculture and Stock, Brisbane. (The cobs should be packed in straw envelopes, commonly used in packing beer bottles, and then placed tightly in a case which should be labelled and branded with the initials of the competitor and the number allotted to his district.)

7. Competitors must notify the Dairy Inspector for the district of the date when the crop shall have matured and be ready for inspection. *Unless this rule is observed, the competitor will be disqualified.* The maize must be thoroughly dry and ripe when harvested.

8. No competitor shall be allowed to employ or permit any labour upon the competition plot standing in his name, other than his own personal labour, excepting in relation to the driving of horses, for which, owing to circumstances, such help may be needed.

9. The competitor in failing to observe closely the rules of this competition becomes liable to disqualification.

10. The competition will close on the 30th June, 1921, and the prizes will be allotted thus:—

The competitors will be grouped according to the following divisions:—

(1) The district supervised by—

Mr. E. W. Ladewig, Dairy Inspector, Beenleigh.

Mr. L. J. Kelly, Dairy Inspector, Harrisville.

Mr. A. K. Henderson, Dairy Inspector, Marburg.

(2) The district supervised by—

Mr. C. C. Pickering, Dairy Inspector, care of Miss Macpherson, Victoria street, West End.

Mr. R. G. Ridgway, Dairy Inspector, care of Department of Agriculture, Brisbane.

Mr. L. J. Verney, Caboolture.

Mr. R. Winks, Dairy Inspector, Gympie.

Mr. J. A. Midgley, Dairy Inspector, Bundaberg.

Mr. W. S. Harding, Dairy Inspector, Esk.

(3) The district supervised by—

Mr. J. H. Barber, Dairy Inspector, Crow's Nest.

Mr. J. J. Carew, Dairy Inspector, Gatton.

(4) The district supervised by Mr. J. Davies, Dairy Inspector, Kingaroy.

- (5) The district supervised by—
 Mr. J. D. Ogilvie, Dairy Inspector, Clifton
 Mr. S. A. Clayton, Toowoomba.
 Mr. J. R. D. Munro, Dairy Inspector, Warwick.
- (6) The district supervised by the Dairy Inspector, Gayndah.
- (7) The district supervised by—
 Mr. L. Moriarty, Dairy Inspector, Dalby.
 Mr. R. S. Sigley, Dairy Inspector, Roma.
 The Stock Inspector, Goondiwindi.
- (8) The Central District of Queensland, including that supervised by Mr. J. Cattanaach, Dairy Inspector, Rockhampton.
- (9) The Northern District of Queensland, including that supervised by—
 Mr. A. Barker, Stock and Dairy Inspector, Mackay.
 Mr. D. Downs, Yungaburra.

11. Three special prizes of the value of £10, £5, and £3 will be awarded to the competitors who stand first, second, and third in the entire competition.

District Prizes.—First, £5; second, £2; third, £1.

If there are less than six competitors, prizes will be allotted as follows:—

Four to five competitors (inclusive), two prizes, first and second.

Two or three competitors (inclusive), one prize only, first.

When only one competitor, he or she will be debarred from participating in the District Prize, but will be eligible to compete for the Special Prizes.

NOTE.—It is in the interest of the entrants to encourage others to compete for the valuable prizes being offered.

No money prizes will be given, but each successful competitor will be allowed to select some article to the value of his prize.

No prize will be awarded unless the yield of corn equals twenty bushels per acre. This stipulation may be waived under very exceptional circumstances in the case of a lower yield.

12. The aggregate points will be 100, and the judging will be based upon the following:—

(a) Quality of maize produced	15 points
(b) Yield of plot	75 „
(c) Notes and records of plot	10 „

13. The Director of Agriculture will be the sole judge of the competition, and his decision shall be final.

W. N. GILLIES, Secretary for Agriculture and Stock.
 Brisbane, 1st September, 1920.

JUVENILE CORNGROWING COMPETITION.

For the juvenile corn-growing competition seventy-three entries were received by the Department of Agriculture, but only thirty-three out of this number completed the conditions, those not doing so having failed to secure a crop owing to drought or through mishap. In districts where the season was favourable high yields were secured, notably on the North Coast and in the Mary Valley (No. 2 district), where seven competitors harvested crops ranging in yield from 109.2 to 151.4 bushels per acre, the highest yield recorded being that obtained by Miss N. Pickering, of Mount View, Eumundi, who was only 13½ years old at the time her nomination was received. Although unsuccessful in winning a special prize, another girl, about a year older (Miss E. Marks, of Alberton, *viâ* Yatala), won the No. 1 district (South Coast) prize with a yield of 138.5 bushels per acre.

PRIZE WINNERS.

RESULTS OF JUVENILE CORN COMPETITION, 1919-20.

Name of Competitor.	Ag.	Yield per Acre in Bushels.	Points Awarded for Yield, Maxi- mum Points, 70.	Quality of Grain and Uniformity of Ear, Maxi- mum Points, 15.	Records Data, Points, 10.	Total Maximum Points, 100.	Remarks.
SPECIAL PRIZES.							
Miss N. Pickering, Mount View, <i>via</i> Eumundi	13½	151.4	68.4	9.9	6	84.3	No. 2 Dist. 1st £10
R. H. Pickering, Mount View, <i>via</i> Eumundi	16	146.5	66.1	10.8	6	82.9	No. 2 Dist. 2nd £5
A. G. McGinn, Oakey Creek, <i>via</i> Eumundi	15½	147.5	66.6	9.3	5	80.9	No. 2 Dist. 3rd £3
No. 1 DISTRICT PRIZES.							
Miss E. Marks, Alberton, <i>via</i> Yatala	14½	138.5	62.5	9.2	7	78.7	1st
W. Schmidt, Alberton, <i>via</i> Yatala	12	96.4	43.5	11.0	4	58.5	2nd
R. Jonasson, Alberton, <i>via</i> Yatala	11	93.4	42.1	10.2	5	57.3	3rd
Reg. Crowther, Pimpama, South Coast Line	12½	94.6	42.7	9.2	6	56.9	
P. A. Abraham, Lark Hill, <i>via</i> Walloon	13½	93.2	42.1	7.4	4	53.5	
H. Beitz, Alberton, <i>via</i> Yatala	12½	77.7	35.1	10.1	4	49.2	
Miss Ruby Lehmann, Car- brook, <i>via</i> Beenleigh	13	70.2	31.7	10.5	6	48.2	
Nor. Crowther, Pimpama, South Coast Line	10	71.3	32.2	9.3	5	46.5	
C. Rohfeldt, Alberton, <i>via</i> Yatala	14½	69.4	31.3	8.7	4	44.0	
J. M. Morrison, Purga ..	13	56.9	25.7	8.7	3	37.4	
E. J. Wolff, Alberton, <i>via</i> Yatala	14½	28.3	12.7	8.9	8	29.6	
F. O. Freese, Lark Hill, <i>via</i> Walloon	14½	28.2	12.7	7.5	4	24.2	
V. F. Abraham, Lark Hill, <i>via</i> Walloon	14½	23.8	10.7	7.2	4	21.9	
No. 2 DISTRICT.							
Miss N. Pickering, Mount View, <i>via</i> Eumundi	13½	151.4	68.4	9.9	6	84.3	1st
R. H. Pickering, Mount View, <i>via</i> Eumundi	16	146.5	66.1	10.8	6	82.9	2nd
A. G. McGinn, Oakey Creek, <i>via</i> Eumundi	15½	147.5	66.6	9.3	5	80.9	3rd
V. R. Ellis, Kandanga, Mary Valley Line	16½	139.3	62.9	8.5	7	78.4	
M. H. McGinn, Oakey Creek, <i>via</i> Eumundi	13½	126.7	57.2	10.8	5	73.0	
A. H. Sims, Gheerulla, <i>via</i> Eumundi	13½	115.2	52.0	12.0	6	70.0	
E. A. Sims, Gheerulla, <i>via</i> Eumundi	14½	109.2	49.3	10.1	6	65.4	
E. A. Guldbransen, Cedar Creek, Samford	16½	78.8	35.6	8.0	5	48.6	
Miss M. I. Guldbransen, Cedar Creek, Samford	17½	69.4	31.3	9.4	5	45.7	
C. A. Hansen, Perry Street, North Bundaberg	14	26.2	11.8	7.2	5	24.0	

PRIZE WINNERS—continued.

RESULTS OF JUVENILE CORN COMPETITION, 1919-20—continued.

Name of Competitor.	Age.	Yield per Acre in Bushels.	Points Awarded for Yield, Maximum Points, 75.	Quality of Grain and Uniformity of Ear, Maximum Points, 15.	Records Field Data. Point, 10.	Total Maximum Points, 100.	Remarks.
No. 3 DISTRICT							
H. Morgenstein, Pinelands, via Crow's Nest	17	59.4	26.8	10.3	4	41.1	1st
No. 4 DISTRICT.							
S. Marshall, Cedar Gap, Wooroolin	16 $\frac{3}{4}$	36.2	16.3	8.4	4	28.7	1st
L. Wiedon, Kingaroy ..	14	25.2	11.3	6.8	7	25.1	2nd
No. 5 DISTRICT.							
G. E. Gonchee, North Killarney	17	105.9	47.8	9.4	9	66.2	1st
W. Gonchee, North Killarney	15	91.0	41.1	8.1	8	57.2	2nd
No. 6 DISTRICT.							
E. D. Meredith, Gurgeena, via Gayndah	13 $\frac{1}{4}$	26.3	11.8	8.3	5	25.1	1st
No. 9 DISTRICT.							
L. A. Favier, Kairi, via Tolga, North Queensland	17	105.3	47.5	9.3	4	60.8	1st
Miss I. J. M. Favier, Kairi, via Tolga, North Queensland	15	96.5	43.5	8.9	4	56.4	2nd
Miss A. Windhaus, Atherton	14	86.7	39.1	10.8	3	52.9	3rd
Miss A. M. Hastie, Atherton	13 $\frac{7}{12}$	55.3	24.9	8.9	6	39.8	

No. 7 District—One competitor, failed to complete.

No. 8 District—Two competitors, failed to complete.

ENCOURAGEMENT TO COFFEE GROWERS.

In our article on the coffee-growing industry we showed how a great impetus was given to it by the appointment of Mr. Newport as instructor in that branch of tropical agriculture. There can be no question as to the suitability of the soil and climatic conditions in all the coastal districts of Queensland, and this has been recognised by the Minister for Agriculture (Mr. Gillies) who has decided to appoint an instructor who will not only give practical advice on the methods of cultivation to be adopted by intending growers, but will also introduce a system of handling the coffee for the growers, on somewhat the same lines as that which has proved so successful in the case of cotton-growing. Mr. Gillies states that in the year 1917-18, the imports of coffee into Australia amounted to 275,818 lb., which shows that there is a good demand for a product which can so easily be grown in this State. The coffee crop of 1917 amounted to about 16,000 lb., which met with ready sale at a remunerative price. Why not, then, increase the acreage until we reach the exporting instead of the importing stage?

GRAIN FOR SALE.

SEED MAIZE.

To growers desirous of obtaining supplies of a pure and reliable strain of improved seed, the following variety is being offered and represents only a limited stock raised from a selected strain of seed:—

Yellow.—Golden Beauty.

CONDITIONS OF SALE.

Applications for seed, with accompanying remittance (exchange added) should be addressed to the Under Secretary for Agriculture, Brisbane. (*Postal address and name of railway station should be given.*)

Advice will be sent when seed is despatched.

Purchasers are requested to write promptly after receipt of seed should any matters require adjustment.

PRICES.

To enable applicants living at a distance to benefit, a flat rate of 15s. per bushel is being charged. This price includes all railage to the nearest railway station, but where steamer freight is necessary this and any charges in relation thereto must be paid by the purchaser, who must furnish instructions concerning shipping arrangements and the name of agent to whom the grain is to be consigned.

Fifteen shillings (15s.) per bushel.

DESCRIPTION OF THE ABOVEMENTIONED VARIETY OF SEED MAIZE FOR SALE.

Golden Beauty.—This is a strong-stalked, fairly hardy variety, and takes about four and a-half months to mature. The ears are of medium size with a somewhat stout red core. In shape they are slightly tapering from base to tip. The rows of grain, usually fourteen in number, are set firmly on the cob. Owing to the characteristic shape of the grain (flat buck-shaped, with a slightly rounded shoulder) the furrows between the rows are a pronounced characteristic. The grain is of medium size, robust, smooth dent type, and of moderate depth; horny in character, reddish-amber in colour, with a distinct yellow cap carrying a small amount of crown starch. The ears turn down as they approach maturity, and are covered with a light "husk."

All previous lists of maize advertised for sale are now cancelled.

Pastoral.

FARMERS' SHEEP ON COASTAL LANDS.

By R. C. WILSON, Assistant Instructor in Sheep and Wool.

When speaking of sheep on the Queensland coastal areas, it is meant to include all areas on the coastal side of the Main Range anywhere between the Tweed River in the south and Cairns on the north, including all the islands inside and on the Barrier Reef, where the rainfall may vary from 40 in. to over 100 in. in places.

Should a farmer have an idea of running sheep on his farm in the coastal areas, he should first consider the suitability of his country and the class of sheep most suitable to run.

These questions, amongst other sheep information, will be fully dealt with in this article.

Although sheep can be run on any part of the coast with a fair amount of care, a farmer must have a reasonable area available in proportion to the number of stock he wishes to run, when he goes in for sheep, just the same as in any other class of stock farming.

The coastal country is very patchy, and it cannot be said that any particular number of sheep can be run until the country has been tried or inspected by an expert, who will then form his opinion after the inspection, but it can be safely said that on good Rhodes grass scrub country up to five sheep to the acre can be run. There are other good grasses that make ideal sheep feed, such as *paspalum dilatatum* and blue couch, but they are not as good as the Rhodes.

Although it is not recommended to run sheep on natural grasses, it is done with varying success in many instances, but it cannot be recommended where the black spear grass is prevalent, as this particular grass seed enters the flesh of the animal, causing serious ill-effects to the health of the animal and loss of condition, when, if not attended to, it finally dies. This grass seed can be regulated to some extent by shearing just before the seed matures, and burning off when dry enough.

On no account should a dairy farmer dispense with his dairy herd and go in for sheep at once, as he is giving up a living he knows something about to take up work he has had no experience in at all. It is always wise to learn slowly with a few sheep, and not pay too high a price for experience.

Most people when speaking of sheep farming seem to have the idea that it is only a matter of putting the sheep on the property and then sitting down until shearing and lambing time. That is a mistaken idea, and to be a success as sheep farmers they must be always attending to their flocks in some capacity, if it is only studying and watching them, when any trouble would be noticed at once.

It is not wise to run both sheep and cattle together in the same paddocks in any numbers as both will suffer in the process. It will be noticed that the cattle will go off first, as they do not do half so well on short picking as the sheep will. Sheep will do a great deal better in small paddocks, so it is wise to subdivide paddocks as much as possible, so as to change the animals about from one paddock to the other. Even if the grass does not appear any better, the stock always seem to improve on the change.

Water is very necessary, although it is often noticed on coastal country when the grass is green and moist that the sheep rarely ever go near the water, but when the grass and feed are dry the animals must have free access to it.

FENCING.

Boundary fences should always be sheep-proof; otherwise, should your neighbours have a supply of feed, or a cultivated paddock handy, and your paddocks are bare, there will always be trouble through the sheep straying and finding feed for themselves.

The only really sheep-proof fencing is wire-netting, but at the present time that is unprocurable for the small man, on account of the high prices, but there are prospects of these prices being much reduced in the near future. A six-wire fence with dropper between posts is a fairly safe fence for a well-fed flock, but would be a poor stop for hungry crossbreds with plenty of feed in sight. The only safe way to keep crossbred sheep from straying is to feed them in their own paddock, which can be done by having provision made for bad times when feed is scarce. This can be done by cultivating for your stock, and if it is not required to feed off, cut and make hay or, better still, pit or stack ensilage, which, if properly cured, can be held in reserve for years or can be used the same season. This can be done at a very small cost, and stands until required as an extra insurance against loss of stock.

It will be found in other closely-settled parts of the world where land is high-priced and in small areas, that the farmers have to cultivate for their flocks. Why not do the same in Queensland, where everything grows so well in good seasons? It is the secret of making a success of all coastal farms where stock are run, whether sheep or cattle.

Increase production by cultivating for stock in good seasons and saving the surplus for bad times, and don't make a "lazy man's country" of it. Queensland compares more than favourably with any country our lads in the A.I.F. (of whom I was one) saw in their travels; but they did see many places with more stock to the square mile on poorer land than ours, and in small areas, through intensive cultivation.

The pests to which sheep are subject on the coast are very few and easily dealt with if proper attention be given them. The two most important are stomach worms (*Strangulus contortus*) and dogs (both domesticated and wild).

The stomach worms can be avoided when stocking clean country by drenching the sheep before bringing them on to the property. A good safe drenching formula for all purposes can be procured, with instructions in pamphlet form, from the Department of Agriculture and Stock, Brisbane, free on application.

Dogs can be treated by fencing them out with wire netting, or, if that is unprocurable, a safe yard must be built near the homestead and the sheep locked up every night. After a short time the sheep will acquire the habit of coming home regularly every night, and all that will be necessary will be to count the flock, close, and fasten the gate.

There are other troubles that occur at odd times, such as tape worms in intestines, lung worm, nasal fly, sheep tick, and louse and scrub tick. Sheep are not troubled with footrot in Queensland, but scald foot often occurs on the low, wet country in good seasons. This is very easily treated by removing affected stock on to higher, dry country.

Sheep always do well on high, well-drained ridges, especially the cleared scrub ridges planted under Rhodes grass, as is seen in many parts of the coast. They suffer less from worms in this class of country on account of there being less surface water lying about, in which the worms can breed.

The breed of sheep most suitable for the farmer on the coastal lands is the crossbred, or such type of sheep as the Corriedale. What is really wanted is a large-framed sheep of good sound constitution that will bring a good price as lamb or full-grown mutton. Should the season be unsuitable for selling lambs, these mature early and cut a good heavy fleece of comeback type about 56.58 quality. Such a class of sheep can be bred from the Border Leicester and Merino cross, or, where there is a heavy rainfall and the country is inclined to be wet, the Romney Marsh and Merino cross is more suited. Lincoln, Leicester, and Dorset Horn are also good breeds to use in crossing with the Merino in Queensland. Dorset Horn has the advantage of coming into season for mating the same as Merino, which gives a better chance of controlling the lambing seasons.

All the coastal farms should run at least a few sheep, if only to breed a few killers for fresh meat on the farm, while there is a ready sale for the wool through the Wool Scheme to help the farmers to receive the best price possible, instituted and run by the Department of Agriculture and Stock, Brisbane. Such farmers' wool is received in from one fleece in a bag to fifteen-bale lots, and all that is required is to address to the Under Secretary and advise that wool is sent on, when, if required, 60 per cent. of the full value can be drawn by the farmer on arrival of the wool in Brisbane.

SOME RECORD PRICES FOR STOCK (1920).

A HIGH-PRICED COLT.

At the Doncaster Yearling Sales, Lord Glanely paid the record price of 14,500 guineas for a colt by The Tetrarch—Bluetit. Bidding was most exciting, and started at 5,000 guineas. Thirteen lots sold at the same time for a total of 54,650 guineas.

STEERS AVERAGE £44 12s.

A remarkable sale of steers is reported from Buenos Ayres, Argentine, where 12,000 steers, bred and raised on the estancia of Mr. Pedro Estanguet, were sold to the Frigorifico Anglo at 30 cents per lb. It is calculated that these steers will give 750 lb. meat per head, which is equal to 225 dollars each, which, at present rates of exchange of 47.58 pence to the dollar, means £44 12s. per head. This is considered the most important sale of beef ever held in any part of the world at one sale and to one establishment.

GREAT AVERAGE FOR PIGS.

Sixty-two head of Berkshire pigs sold at Eaton, the stud farm of the Duke of Westminster, for an average price of £115 3s. 6d. Forty-nine sows averaged £124 12s. 6d. each, and thirteen boars averaged 80 guineas each. This is considered a world's record for a herd of pigs not selected. A three-year-old sow, Eaton Belle 2nd, by War Loan, made the record price of 610 guineas to the Wellington Live Stock Company. A young sow, Eaton Winsome Lum, sold for 500 guineas to Mr. Joseph Carton, which is a record for the age; and two others made 250 guineas and 165 guineas respectively. The stock boar War Loan, and three others, made 100 guineas each.

Dairying.

PROFITS ON PIG-RAISING.

A dairy farmer in the Palmwoods district sends us the following:—

“On 9th of March last I had a litter of pigs farrowed. The sire is a medium light York and the dam a Berkshire—Poland-China cross. Of this litter, five lived. These were fed on a ration of skim milk and pollard, and latterly maize in addition. They were slaughtered at the Murarrie factory on the 18th of August, being then five months and nine days old. The recorded weights were as follows:—142 lb., 140 lb., 144 lb., 127 lb., and 123 lb., making a total of 676 lb. At 11d. per lb., the value of the five pigs is £30 19s. 8d.

The cost of food supplied amounted to £9 2s. 6d., thus leaving a net profit of £21 17s. 2d.

Poultry.

REPORT ON EGG-LAYING COMPETITION, QUEENSLAND AGRICULTURAL COLLEGE, AUGUST, 1920.

Although westerly winds were somewhat prevalent during the month, some splendid laying can be reported, more especially during the latter part of August. Scarcely any broodies have been removed from the pens, and this materially assisted the heavy scores, as this trouble usually makes itself very noticeable at this time of the year. The single scores of the heavies again have pride of place for the month's output. R. Burns's "E" and A. Gaydon's "F" bird each laid 30 eggs, whilst A. Shanks's "A," D. Fulton's "F," and E. F. Dennis's "F" each laid 29 eggs in the 31 days. Quite a number laid from 25 to 28 eggs for the month. J. E. Ferguson's Chinese Langshan in "E" pen, by laying 27 for the month, brings her score to 107 for the five months. The highest single score obtained by a Leghorn was 27, the following breeders each having one bird which laid that number of eggs:—Haden Poultry Farm, Dr. E. C. Jennings, and L. G. Innes. Two deaths occurred during the month, S. L. Grenier losing one in his group through ovarian trouble, and Nobby Poultry Farm's "E" bird dying of tuberculosis. Green feed has been given twice daily—at midday and the last thing in the evening—consisting of lucerne, rape, mustard, and milk thistles. The following are the individual records:—

Competitors.	Breed.	Aug.	Total.
LIGHT BREEDS.			
*G. Trapp	White Leghorns	139	607
*O. W. J. Whitman	Do.	135	606
*Haden Poultry Farm	Do.	137	602
Geo. Lawson	Do.	144	600
*S. McPherson	Do.	127	577
*J. J. Davies	Do.	132	575
*J. Newton	Do.	133	567
*Quinn's Post Poultry Farm	Do.	133	557
*W. Becker	Do.	122	551
*J. M. Manson	Do.	138	551
*T. Fanning	Do.	118	537
*W. and G. W. Hindes	Do.	134	536
*Dr. E. C. Jennings	Do.	136	536
*J. H. Jones	Do.	125	533
*H. Fraser	Do.	130	527
*G. Williams	Do.	125	525
*E. A. Smith	Do.	126	510

EGG-LAYING COMPETITION—*continued.*

Competitors.	Breed.	Aug.	Total.
LIGHT BREEDS— <i>continued.</i>			
S. L. Grenier	White Leghorns ...	120	509
Thos. Eyre	Do.	132	501
*L. G. Innes	Do.	133	494
*Mrs. L. F. Anderson	Do.	136	494
*Range Poultry Farm	Do.	113	491
*S. W. Rooney	Do.	109	489
*N. A. Singer	Do.	138	489
Mrs. R. Hodge	Do.	144	482
W. Morrissey	Do.	120	475
*B. Chester	Do.	125	475
*Mrs. L. Henderson	Do.	114	464
Miss E. M. Ellis	Do.	131	458
A. J. Anderson	Do.	107	456
*Thos. Taylor	Do.	119	455
Avondale Poultry Farm	Do.	133	448
E. Chester	Do.	128	447
C. Langsbecker	Do.	119	437
H. P. Clarke	Do.	123	435
C. M. Pickering	Do.	107	431
R. C. J. Turner	Do.	123	429
C. H. Towers	Do.	124	417
S. Chapman	Do.	124	391
W. D. Evans	Do.	118	357
H. A. Mason	Do.	128	348
C. A. Goos	Do.	113	316

HEAVY BREEDS.

*R. Holmes	Black Orpingtons ...	129	642
*D. Fulton	Do.	136	635
*E. F. Dennis	Do.	139	594
*R. Burns	Do.	143	593
H. M. Chaille	Do.	148	573
*E. Morris	Do.	137	572
*A. E. Walters	Do.	140	567
*A. Gaydon	Do.	154	564
*A. Shanks	Do.	153	563
*W. Smith	Do.	132	549
*E. Oakes	Do.	135	524
J. E. Smith	Do.	150	520
*T. Hindley	Do.	116	516
*R. B. Sparrow	Do.	125	475
Parisian Poultry Farm	Do.	136	473
G. Muir	Do.	134	464
*J. Cornwell	Do.	150	457
Mrs. G. H. Kettle... ..	Do.	131	456
R. C. Cole	Do.	114	449
*Nobby Poultry Farm	Do.	92	445
*J. E. Ferguson	Chinese Langshans ...	121	436
*E. Stephenson	Black Orpingtons ...	105	417
G. Flugge	Do.	125	290
Total ... ..	...	8,364	32,459

* Indicates that the pen is being single tested.

RESULTS OF SINGLE HEN PENS.

Competitors.	A.	B.	C.	D.	E.	F.	Total.
LIGHT BREEDS.							
G. Trapp	109	98	107	102	106	90	607
O. W. J. Whitman	99	94	106	96	103	108	606
Haden Poultry Farm	118	80	115	106	90	93	602
S. McPherson	103	95	87	97	108	87	577
J. J. Davies	99	95	94	115	89	83	575
J. Newton	115	88	98	67	94	105	567
Quinn's Post Poultry Farm	106	101	102	91	75	82	557
J. H. Jones	87	92	96	97	101	80	553
W. Becker	97	98	102	87	69	98	551
J. M. Manson	97	93	105	88	75	93	551
T. Fanning	87	99	91	101	104	105	537
W. and G. W. Hindes	98	92	78	97	79	97	538
Dr. E. C. Jennings	88	102	77	83	82	104	536
H. Fraser	81	77	93	94	96	81	527
G. Williams	87	88	89	87	100	74	525
E. A. Smith	82	78	97	84	89	79	510
L. G. Innes	41	77	108	82	105	81	494
Mrs. L. F. Anderson	103	91	98	72	66	64	494
Range Poultry Farm	67	82	86	99	73	84	491
S. W. Rooney	62	60	104	83	86	94	489
N. A. Singer	83	75	86	100	74	71	489
B. Chester	84	56	81	89	86	79	475
Mrs. L. Henderson	62	75	85	78	90	74	464
Thos. Taylor	99	84	48	81	68	75	455

HEAVY BREEDS.

R. Holmes	108	110	101	103	108	112	642
D. Fulton	111	115	96	94	87	132	635
E. F. Dennis	97	81	110	97	86	123	594
R. Burns	95	73	114	90	123	93	593
E. Morris	99	100	106	76	85	106	572
A. E. Walters	91	96	76	112	85	107	567
A. Gaydon	91	121	87	70	76	119	564
A. Shanks	74	85	97	114	66	137	563
W. Smith	78	112	99	105	76	78	549
E. Oakes	80	100	106	53	96	89	524
T. Hindley	88	108	88	107	50	75	516
R. B. Sparrow	93	26	100	96	64	96	475
J. Cornwell	74	110	76	48	63	86	457
Nobby Poultry Farm	80	119	59	121	46	20	445
J. E. Ferguson	33	72	61	82	107	71	436
E. Stephenson	99	74	56	88	53	47	417

The weighing of eggs is not yet completed, so that details cannot appear in this month's report.

CUTHBERT POTTS,
Principal.

FINAL REPORT OF THE SIXTEENTH EGG-LAYING COMPETITION, QUEENSLAND AGRICULTURAL COLLEGE—PART 2.

(Continued from September number of the Journal.)

GENERAL COMMENTS ON "TRUENESS-TO-TYPE" COMPETITION BIRDS.

DETAILS OF CLASSIFICATION.

Class.

Mrs. L. Anderson	..	..	1	Even throughout ; A possesses ideal headpiece.
Haden Poultry Farm	..	..	2	D and E could do with a little more size. Taken throughout, a tight-feathered, hardy, business-like pen.
H. Fraser	..	..	2	Good size ; C and D, high tail carriage ; A possesses ideal body.
Dr. Jennings	..	..	3	Too high in carriage ; can do with more size ; an improvement on last pen ; excellent doers, tight-feathered.
Range Poultry Farm	..	..	1	Very even throughout ; good heads.
Thos. Taylor	..	..	2	Very uniform in size ; can do with more comb ; splendid eyes.
B. Caswell	..	..	2	Magnificent face and eyes ; tail carriage inclined to be high.
Dixie Egg Plant	..	..	2	A big improvement in size on previous pen ; B has outstanding superiority in type.
J. M. Manson	..	..	2	Very even in size and shape ; F has slight side spikes on comb ; excellent doers ; splendid in eye and face.
L. G. Innes	..	..	3	Lack uniformity in size and shape.
T. Fanning	..	..	1	A fine pen throughout ; A could do with a little more size ; headpieces all that could be desired.
J. J. Davies	..	..	1	A pen we like very much in every way.
W. Becker	..	..	2	A big improvement on previous pen ; tail carriage can still be lowered a little.
Quinn's Post Poultry Farm	..	..	1	Very even in type and size.
O. W. J. Whitmen	..	..	1	Approaching English standard.
G. W. Hindes	..	..	1	A, B, C, and D of exceptional merit ; E and F just a trifle small.
Mrs. R. Hunter	..	..	2	Headpieces a little coarse ; D, a very good specimen.
W. Hindes	..	..	1	A, B, C, and D stand right out ; E and F on the small side.
W. Lyell	..	..	3	Defective combs ; F, best body formation.
Mrs. A. G. Kurth	..	..	2	E, tail carriage too high ; good size throughout ; we like F very much for type.
E. A. Smith	..	..	2	C spoils pen, being very much on the small side ; otherwise first class.
C. P. Buchanan	..	..	4	A has side spikes ; C, too small ; D, deformed.
H. Puff	..	..	1	Good size and type ; E and F of exceptional quality.
R. Holmes	..	..	2	Fair sized and uniform ; C and D, inferior combs.
E. Morris	..	..	3	B has side spikes ; C could do with more size ; D closely approaching ideal.
E. M. Larsen	..	..	1	Lower on leg than majority ; good heads ; a little more size wanted.
F. W. Leney	..	..	3	On racy side, with the exception of A, which approaches our requirements.
J. Reilly	..	..	3	Too variable ; side spikes in evidence.
W. Smith	..	..	1	Good heads ; have size and are not so long in back as majority ; D is our choice.
T. Hindley	..	..	2	Fail in colour ; B shows white in lobe ; good eyes ; can do with more moderation in comb.
R. Burns	..	..	2	Side spikes on E ; a big improvement in type on previous pens.

GENERAL COMMENTS ON "TRUENESS-TO-TYPE" COMPETITION BIRDS
—continued.

DETAILS OF CLASSIFICATION—continued.

Class.			
D. Fulton	3	Fail in type and size.	
Nobby Poultry Farm ..	2	Side spikes on F's comb a bit overdone ; splendid eyes ; first class colour and size ; an improvement.	
Mars Poultry Farm ..	2	Side spikes on D, and F being pale in eye, spoil pen from being the most typical in the competition ; possess size, shape, and are very low.	
A. Shanks	2	Type too variable ; D, E, and F, splendid type ; E possesses best body to our liking in the whole competition.	
E. F. Dennis	1	Good size ; excellent heads ; could do with a little more width in proportion to their size.	
A. E. Walters	2	Fail in headpieces ; good bodies, low set ; colour can be improved.	
Kelvin Poultry Farm ..	1	A good uniform pen.	
W. Barber	2	Type not consistent ; combs over developed ; low set ; feathering of tight nature.	
J. Ferguson	3	B and C, side spikes ; type variable.	
W. Morrissey	3	Side spikes on two individuals ; otherwise first class.	
J. W. Newton	1	Very even birds of good type ; remarkable doers.	
B. Chester	2	Too fine and racy ; splendid eyes and faces.	
C. Goos	2	Good body formation ; fail in eye.	
H. A. Jones	3	Another finely built, racy class of bird.	
G. Trapp	2	One small specimen spoils pen completely ; good eyes and faces.	
J. H. Jones	1	Even serviceable pen ; good doers ; size can be increased a little.	
Geo. Williams	1	Very uniform ; excellent feeders.	
Geo. Kettle	2	Type variable ; some inclined to beefiness in head.	
N. A. Simpson	1	Very even ; nice textured combs ; good bodies and carriage ; shy feeders at commencement, but have improved vastly.	
Mrs. N. Charteris	3	Uneven ; not as good doers as one would like.	
H. O. Jones	1	A solid close-feathered pen ; good bone ; splendid feeders.	
W. A. Wilson	2	Too fine, especially in bone.	
S. McPherson	1	A little more size required ; excellent doers.	
Oakleigh Poultry Farm ..	3	On fine side and variable in outline.	
S. W. Rooney	1	Size can be improved ; excel in stamina and evenness.	
Geo. Byrnes	3	Two small birds spoil the chance of four good ones.	
R. J. Turner	2	Good bodies and nice size in five birds ; pen spoilt by one a trifle small and a bad doer.	
Geo. Nutt	1	Very even ; typical headpieces ; nice shape ; good backs ; just a little more size wanted.	
Burleigh Pen	1	Even, large, big-boned stock ; backs a little on long side.	
R. B. Sparrow	2	A nice all-round pen ; size and shortness outstanding features ; one bird too much feather on shank.	
H. Ashworth	1	Good size and even combs ; a trifle overgrown.	
C. H. Singer	2	Nice type, but indifferent feeders.	
J. A. Cornwell	1	Another big-boned pen ; a little long in back ; good doers	
A. Homan	2	Not as uniform as we would like ; indifferent feeders at times.	
A. Gaydon	2	Type not consistent ; one bird possesses side spikes on comb.	
J. H. Dunbar	2	Good spangling and type, but too dwarfed.	

WEIGHT OF EGGS, SINGLE HEN PENS.

	A.	B.	C.	D.	E.	F.	Pen Average.
	Oz.	Oz.	Oz.	Oz.	Oz.	Oz.	Oz.
LIGHT BREEDS.							
Mrs. Anderson	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$
Haden Poultry Farm	1 $\frac{7}{8}$	2 $\frac{1}{8}$	2	2	2 $\frac{1}{4}$	2	2
Harold Fraser	2 $\frac{1}{4}$	2	2 $\frac{1}{8}$	1 $\frac{7}{8}$	2	2	2
Dr. Jennings	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{4}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{4}$	2 $\frac{1}{8}$
Range Poultry Farm	2 $\frac{1}{8}$	2 $\frac{1}{4}$	2	1 $\frac{3}{4}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2
Thos. Taylor	2	1 $\frac{7}{8}$	2	1 $\frac{7}{8}$	1 $\frac{7}{8}$	2 $\frac{1}{8}$	2
B. Caswell	2 $\frac{1}{4}$	1 $\frac{7}{8}$	2 $\frac{1}{8}$	1 $\frac{3}{4}$	2	2 $\frac{1}{8}$	2
Dixie Egg Plant	1 $\frac{3}{4}$	2 $\frac{1}{8}$	2	2	1 $\frac{7}{8}$	2	2
J. M. Manson	2	2 $\frac{1}{4}$	2	1 $\frac{3}{4}$	2	2	2
L. G. Innes	2 $\frac{1}{8}$	1 $\frac{3}{4}$	2	2	2 $\frac{1}{8}$	2	2
T. Fanning	2	2	1 $\frac{7}{8}$	1 $\frac{7}{8}$	2	1 $\frac{7}{8}$	1 $\frac{7}{8}$
J. Davies	2 $\frac{1}{8}$	2	2 $\frac{1}{8}$	1 $\frac{7}{8}$	1 $\frac{7}{8}$	2	2
W. Becker	1 $\frac{7}{8}$	2	1 $\frac{7}{8}$	2 $\frac{1}{8}$	2	2 $\frac{1}{8}$	2
Quinn's Post Poultry Farm	2 $\frac{1}{8}$	2	2	1 $\frac{3}{4}$	2 $\frac{1}{8}$	2	2
O. W. Whitman	2 $\frac{3}{8}$	2	2 $\frac{1}{4}$	2 $\frac{3}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{4}$	2 $\frac{1}{4}$
G. W. Hindes	2 $\frac{1}{4}$	2	2	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$
Mrs. R. Hunter	2	2*	2	1 $\frac{7}{8}$ *	2	2	2
W. Hindes	2	2	2 $\frac{1}{4}$	2	2	2	2
W. Lyell	1 $\frac{7}{8}$	2	2	2*	1 $\frac{7}{8}$	2 $\frac{1}{4}$	2
Mrs. A. G. Kurth	2	2 $\frac{1}{8}$	2 $\frac{1}{4}$	2 $\frac{1}{8}$	2 $\frac{1}{4}$	2	2 $\frac{1}{8}$
E. A. Smith	2	2 $\frac{1}{8}$	1 $\frac{7}{8}$	2	1 $\frac{7}{8}$	1 $\frac{7}{8}$	2
C. P. Buchanan	2 $\frac{1}{4}$	2	1 $\frac{7}{8}$	2	1 $\frac{7}{8}$	2	2
HEAVY BREEDS.							
T. B. Barber	2	2 $\frac{1}{8}$	1 $\frac{7}{8}$	1 $\frac{7}{8}$	2	2 $\frac{1}{8}$	2
Kelvin Poultry Farm	2	1 $\frac{3}{4}$	2 $\frac{1}{8}$	1 $\frac{7}{8}$	1 $\frac{7}{8}$	1 $\frac{3}{4}$	1 $\frac{7}{8}$
J. Ferguson	1 $\frac{7}{8}$	2	1 $\frac{7}{8}$ *	2	2	1 $\frac{7}{8}$ *	1 $\frac{7}{8}$
A. E. Walters	1 $\frac{7}{8}$ *	2*	1 $\frac{7}{8}$	2	2	2	2
E. F. Dennis	1 $\frac{7}{8}$	2	1 $\frac{7}{8}$	2	2	1 $\frac{7}{8}$	1 $\frac{7}{8}$
A. Shanks	2 $\frac{1}{8}$	2 $\frac{1}{8}$	1 $\frac{3}{4}$	2	1 $\frac{7}{8}$	1 $\frac{7}{8}$	1 $\frac{7}{8}$
Mars Poultry Farm	2	2	2	2	1 $\frac{7}{8}$	2 $\frac{1}{8}$	2
Nobby Poultry Farm	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2	2 $\frac{1}{8}$	2	2 $\frac{1}{8}$	2 $\frac{1}{8}$
D. Fulton	2	2	2	2	1 $\frac{7}{8}$	1 $\frac{7}{8}$	2
R. Burns	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	1 $\frac{3}{4}$	2 $\frac{1}{8}$	2	2
T. Hindley	1 $\frac{7}{8}$	1 $\frac{7}{8}$	2	2 $\frac{1}{8}$	2	2	2
W. Smith	2 $\frac{1}{8}$	2	2	2	1 $\frac{7}{8}$	2	2
W. H. Reilly	2	2	2	2	2 $\frac{1}{4}$	1 $\frac{7}{8}$	2
F. W. Leney	2	2*	1 $\frac{7}{8}$	1 $\frac{7}{8}$	2 $\frac{1}{4}$	2	2
E. M. Larsen	2	1 $\frac{3}{4}$	1 $\frac{7}{8}$	2	1 $\frac{7}{8}$	2*	1 $\frac{7}{8}$
E. Morris	2 $\frac{1}{8}$	1 $\frac{3}{4}$	1 $\frac{7}{8}$	2 $\frac{1}{4}$	1 $\frac{7}{8}$	2 $\frac{1}{8}$	2
R. Holmes	2	1 $\frac{7}{8}$	1 $\frac{3}{4}$	2 $\frac{1}{8}$	1 $\frac{7}{8}$	2	2
H. Puff	2 $\frac{1}{8}$	2 $\frac{5}{8}$	2 $\frac{3}{8}$	2 $\frac{1}{4}$	2 $\frac{1}{4}$ *	2 $\frac{3}{8}$	2 $\frac{1}{4}$

The individual averages are obtained from the weights of six eggs. Cases where less than six eggs have been weighed are marked *. The pen average is taken from the whole 36 eggs. As each average is given to the nearest $\frac{1}{8}$ -oz., the pen average is not necessarily the average of the individual averages. Examples :—

	A.	B.	C.	A.	B.	C.
	Oz.	Oz.	Oz.	Oz.	Oz.	Oz.
	2	2	1 $\frac{7}{8}$	2	2	1 $\frac{7}{8}$
	2	2	1 $\frac{7}{8}$	2	2	1 $\frac{7}{8}$
	2	2	1 $\frac{7}{8}$	2	2	1 $\frac{7}{8}$
	2	2	1 $\frac{7}{8}$	2	2	1 $\frac{7}{8}$
	1 $\frac{7}{8}$	1 $\frac{7}{8}$	1 $\frac{3}{4}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2
	1 $\frac{7}{8}$	1 $\frac{7}{8}$	1 $\frac{3}{4}$	2 $\frac{1}{8}$	2 $\frac{1}{8}$	2
Average to nearest $\frac{1}{8}$	2	2	1 $\frac{7}{8}$	2	2	1 $\frac{7}{8}$
Average of 18 to nearest $\frac{1}{8}$	1 $\frac{7}{8}$ oz.			2 oz.		

GROUP PENS.

	Average Weight of Eggs.	Variation.
LIGHT BREEDS.		
W. Morrissey	2 $\frac{1}{8}$ oz.	1 $\frac{7}{8}$ to 2 $\frac{1}{4}$ oz.
J. W. Newton	2 "	1 $\frac{3}{4}$ to 2 $\frac{1}{8}$ "
B. Chester	2 "	1 $\frac{3}{4}$ to 2 $\frac{1}{8}$ "
Chris. Goos	1 $\frac{7}{8}$ "	1 $\frac{5}{8}$ to 2 $\frac{1}{8}$ "
H. A. Jones	2 "	1 $\frac{3}{4}$ to 2 $\frac{1}{4}$ "
Geo. Trapp	2 "	1 $\frac{3}{4}$ to 3 $\frac{3}{8}$ "
J. H. Jones	2 "	1 $\frac{7}{8}$ to 2 $\frac{1}{4}$ "
Geo. Williams	1 $\frac{7}{8}$ "	1 $\frac{5}{8}$ to 2 $\frac{1}{4}$ "
G. H. Kettle	2 "	1 $\frac{7}{8}$ to 2 $\frac{1}{4}$ "
N. A. Singer	2 "	1 $\frac{3}{4}$ to 3 $\frac{1}{8}$ "
Mrs. N. Charteris	2 "	1 $\frac{7}{8}$ to 2 $\frac{1}{8}$ "
H. O. Jones	2 "	1 $\frac{3}{4}$ to 2 $\frac{1}{8}$ "
W. A. Wilson	1 $\frac{7}{8}$ "	1 $\frac{5}{8}$ to 2 $\frac{1}{8}$ "
S. McPherson	2 "	1 $\frac{5}{8}$ to 2 $\frac{1}{8}$ "
Oakleigh Poultry Farm	2 "	1 $\frac{3}{4}$ to 2 $\frac{1}{8}$ "
S. W. Rooney	2 "	1 $\frac{7}{8}$ to 2 $\frac{1}{8}$ "
Geo. J. Byrnes	1 $\frac{7}{8}$ "	1 $\frac{3}{4}$ to 2 $\frac{3}{8}$ "
R. J. Turner	2 $\frac{1}{8}$ "	1 $\frac{7}{8}$ to 2 $\frac{1}{4}$ "

HEAVY BREEDS.

Geo. Nutt	1 $\frac{7}{8}$ "	1 $\frac{3}{4}$ to 2 $\frac{1}{8}$ "
Mrs. M. E. Smith	2 "	1 $\frac{3}{4}$ to 2 $\frac{1}{8}$ "
R. R. Sparrow	2 "	1 $\frac{7}{8}$ to 2 $\frac{1}{8}$ "
H. Ashworth	2 "	1 $\frac{3}{4}$ to 2 $\frac{3}{8}$ "
C. H. Singer	1 $\frac{3}{4}$ "	1 $\frac{5}{8}$ to 2 $\frac{1}{8}$ "
J. A. Cornwell	1 $\frac{7}{8}$ "	1 $\frac{5}{8}$ to 2 "
A. Homan	1 $\frac{7}{8}$ "	1 $\frac{5}{8}$ to 2 $\frac{1}{8}$ "
J. H. Dunbar	1 $\frac{7}{8}$ "	1 $\frac{5}{8}$ to 2 "
A. Gaydon	2 "	1 $\frac{7}{8}$ to 2 $\frac{1}{4}$ "

In all groups at least 30 eggs were weighed, and for single pens at least 6 eggs (except in cases marked *) were taken. All results are given to the nearest $\frac{1}{8}$ -oz.

(To be continued.)

QUEENSLAND PRICES CURRENT IN 1895.

A Queensland correspondent writing to his friends in Newcastle, England, 25 years ago, said:—"Things are looking up slightly, but the outlook is gloomy for the farmer. At the present time the following prices are ruling:—Maize, 8d. a bushel (56lb.); butter, 2d. to 9d. a lb.; potatoes, 1s. 6d. to 2s. a cwt.; honey, 2d. a lb.; hens, 1s. 6d. a couple; roosters, 2s. a couple; geese, 3s. 6d. a pair; turkeys, 5s. a pair; pigeons, 4d. a pair; eggs, 6d. a dozen; sheep (merino wethers) 2s. 9d. to 4s. 6d. each; pigs (prime), £1 to 30s.; cattle—fat cows, £1 10s. each; fat bullocks, £2 10s. to £2 13s. each; yearling heifers, 8s. 6d. each; draught horses, £3 10s. each; milch cows, with calves, £1 5s. each, and so on."

It may be interesting to our readers to compare our Market Report for the period from 1st July, 1896 to 30th June, 1897, published in the first issue of the *Queensland Agricultural Journal* for August, 1897, with that of August, 1920, showing as they do the great increase in the prices of stock, farm products, poultry, fruit, vegetables, &c., due mainly to the enhanced cost of materials, labour, implements, freights, &c., before and during the war, the effects of which are still being felt by all classes of the community.

Tropical Industries.

THE NORTHERN SUGAR PLANTATIONS.

The General Superintendent of the Bureau of Sugar Experiment Stations has received the following report from the Field Assistant, Mr. J. C. Murray:—

“After leaving the Lower Burdekin district, the areas of Innisfail, Babinda, Gordonvale, and Mossman were visited.

INNISFAIL.

“A great deal of this year's crop has arrowed, especially that which was planted early. Many of the growers are reluctant to cut as yet, owing to the low density in much of the still growing cane, preferring to take the cane off later in the season, in hopes of a higher sugar content. With regard to tonnage, the farmer this year should get about 80 per cent. of a normal crop.

“With regard to planting and the selection of plants, greater care is required with the latter than is at present being taken by a number of farmers, especially with Badila. This variety, if it is to be maintained a high quality cane, wants careful planting and selecting. Plants should be taken from the best plant or first ratoon crop a farmer has; from, if possible, a different type of soil. The land should be thoroughly cultivated, and, to avoid the danger of being flooded by heavy rains, well drained.

“Liming and green manuring are still very necessary, for, as pointed out in previous reports, it is vital to restore the soil after a period of heavy cropping, by methods calculated to replenish the supplies of nitrogen and reduce the acidity of the soil.

BABINDA.

“Crushing was in full swing at Babinda, and matters seemed to be progressing very favourably. The cane was coming in steadily, and, although the season started with low density in the cane, a big improvement is now in evidence. The general appearance of this area is prosperous, and people are optimistic as to their future prospects.

“Much of the cane here has arrowed, as at Innisfail, and grubs are very bad in some places. Some of the growers are using arsenic.

“Considerable interest is being taken in the work of the South Johnstone Experiment Station, and growers are much appreciating the work being done there.

“With regard to new varieties, farmers would probably do well if they obtained some Q.855 and gave it a trial. There is already some Q.813 growing and looking fairly well. Growers planting their Queensland seedlings would be well advised if they did not plant too early. July or August are good months. Being rapid growers and good strikers, they have a tendency to mature quickly and will probably not give the same results if planted early.

“The use of lime is still recommended on these farms. The clearing away of scrub and old timber, roots, &c., in the vicinity of cultivation would also be an advantage, as these things harbour pests. The cutting down and burning of heavy rooting herbaceous tropical plants is especially recommended.

GORDONVALE.

“Everything is going well at the Mulgrave as far as milling and harvesting operations are concerned. Mr. Howe and his staff are very satisfied at the way things are going, and, although the crushing will not be heavy, it should be about 90 per cent. normal.

“Grubs are the principal enemies of the farmer at Gordonvale. Just at present the use of arsenic is being tried in a fairly extensive manner.

“I am satisfied that many of the cane pest problems would be partly solved if ever growers could go in for intensive cultivation.

“Planting was in progress at the time of visiting, the soil being in good condition. D.1135, Badila, and Clark's Seedling were being principally planted.

MOSSMAN.

"Having had a severe handling with the cyclone, Mossman has not quite recovered. There was a large number of heavy losses on this area, so consequently a little depression is only natural.

"Of the varieties growing, Clark's Seedling suffered the most, the Badila and D.1135 standing much better.

"One farmer, by curious coincidence, had his cane saved by the flood completely covering it and saving the crop from the devastating wind.

"However, matters are rapidly becoming normal, and planting is going ahead. The mill is having a good run and the management expects a season almost up to normal.

"An excellent deposit of limestone has been discovered near Port Douglas, and, from the crushed sample seen, should be extremely valuable for supplying agricultural lime to the farmers. This will greatly benefit the district, as lime is badly needed for the cane soils, the acidity of which is becoming more pronounced year by year.

"Meatworks fertiliser is being used by many of the growers during planting operations, to the extent of about 5 cwt. to the acre.

"Varieties doing well at Mossman are D.1135, Clark's Seedling, Hybrid No. 1, Badila, Q.813, Q.855, Mowbray Seedling, N.G.241, H.Q.409, and H.Q.458.

"Of the varieties mentioned, other than the staple ones, Q.855 will probably respond better than the rest. There are a number of other varieties in the Mossman district, but their growth is indifferent as yet.

"Cane pests are fortunately not bad this year, although the farmers always have to keep watch for wild pigs. Rats are not giving so much trouble as heretofore."

THE SUGAR CROP OF 1920.

The General Superintendent of the Bureau of Sugar Experiment Stations (Mr. H. T. Easterby) states that the estimate of the present season's cane crop is about 1,365,000 tons of cane. This should produce about 160,000 tons of raw sugar. Of this amount it is anticipated that 114,000 tons will be made by the mills north of Mackay, and 46,000 tons by those mills situate in Mackay and southwards. This great falling-off is largely due to the recent severe drought, which persisted well into the present year. With the New South Wales production added to the above figures, there will be a shortage of at least 100,000 tons of sugar, which will have to be made up by importations if the consumption of sugar remains at its present level. The outlook for next year is much more promising, due to the better price now offering, and large areas of land have been prepared for planting with cane in almost every sugar district, so that there should be a fine crop next year, given good climatic conditions.

The production of last year (1919) was 162,136 tons of raw sugar, which was made from 1,258,760 tons of cane. This yield of sugar was much better than was at first anticipated, owing to the high commercial sugar content in the cane, due partly to the drought. The tons of cane taken to make 1 ton of sugar were only 7.76, the lowest amount in the history of the industry.

"BUNCHY TOP" IN BANANAS.

The presence of this disease in some of the Southern Queensland banana plantations has aroused planters to make inquiries as to the nature and cause of the trouble and what means there are of combating it. They will do well to study the following notes on the subject by G. P. Darnell-Smith, D.Sc., F.I.C., F.C.S., which appeared in the August issue of the "Agricultural Gazette of New South Wales":—

The external signs of "bunchy top" are well known, but it may be advisable to call attention to some internal signs.

Healthy banana tissue, both of the corm and of the pseudo-stem, is almost dead white when first cut across. It may, of course, turn to purplish colour on the outside soon after it has been cut with a steel knife, owing to the action of tannin and the formation of a sort of ink.

The unhealthy tissue of a bunchy top corm is pink or reddish brown. In bananas in the incipient stages of the disease in the lower part of the corm, irregular threads, yellowish red or light brown in colour, are seen. In more advanced stages of the disease these threads are darker and reach the base of the pseudo-stem, and they may run up the stem for a considerable distance.

From these unhealthy corms, cultures of bacteria have been obtained under suitable conditions, which form white, circular, moist, glistening colonies. These colonies must consequently be regarded with suspicion.

Growers are recommended, therefore—

1. Not to plant any bulbs showing the internal symptoms referred to.
2. To dig out and *destroy completely* all bunchy top plants.
3. To keep one set of tools for dealing with bunchy top plants, and to use them for no other purposes.

Colonies of bacteria somewhat similar to those from banana corms have been obtained from the roots of sugar-cane showing signs of bunchy top.

The reddish sap that collects in the hollowed-out rhizome of a bunchy top plant has been found to have an extraordinarily rapid withering effect upon young shoots placed in it.

The presence of the reddish threads (diseased vascular bundles) is not peculiar to the bunchy top disease; they are found in other banana diseases, including the Panama disease. Dr. Brandes has given a very detailed account of Panama disease in "Phytopathology," vol. 9, No. 9. Several of the symptoms of this disease are found upon bunchy top plants. The Cavendish banana is not supposed to be susceptible to the disease, which is caused by a fungus, *Fusarium cubense*. A *Fusarium* fungus has occasionally been found upon bunchy top plants.

A bunchy top plant must therefore be regarded as possibly infectious, and the object of the present note is to inform growers of the advisability of destroying bunchy top plants completely (to dig them out and leave them on the ground is of no advantage), and to keep one set of tools for dealing with affected plants and to use them for no other purpose.

That any organism is the actual cause of a disease can only be demonstrated by a series of infection experiments carefully carried out, and these take time, but in the meantime (additional to the foregoing precautions) strict attention to the selection of healthy suckers from healthy stock, and the rejection of those showing internal signs of disease (the red threads can be seen where the sucker has been detached from the parent corm) is recommended as the surest method of eliminating bunchy top.

As still further precautions, the cut end of suckers should be dipped in lime before being planted, and places from which bunchy top plants have been removed should have lime dug into them, and new plants should not be set in such spots for a considerable period.

THE SPACING OF COTTON.

An interested grower has written asking for an opinion on the spacing of cotton plants. He referred to an article in the "Progressive Farmer" on this subject. This article gives the result of certain experiments carried out at Experimental Stations on the Mississippi regarding the yields from cotton planted at different distances apart. The general results of these experiments indicated that the closer together the plants are left in the row the higher the yield, their minimum being 8 inches. It was also stated that certain fields where the cotton was not thinned at all, but left as it came up from the planting (very thick in the row) gave more cotton than any other method. Thinning was not only an expense but reduced the yield.

Recent experiments in this country have borne out, to a point, the results secured in Mississippi. For example the Rustenberg Experimental Station ran trials with different distances of planting from 8 to 24 inches between the plants in the row. The results of these trials indicated the highest yield from planting 10 inches apart in the row. No thorough experiment has been carried out in Natal with this object, but as far as Upland cotton is concerned the results mentioned above are applicable. —*South African Sugar Journal*.

NEGLECTED INDUSTRIES.

RICE AND COFFEE.

There are many tropical and sub-tropical field crops which can be as easily raised in all the costal districts of Queensland as in their native habitat. In confirmation of this statement we may instance sugar, cotton, coffee, rice, arrowroot, tea, rubber, cocoanuts, sisal hemp, bananas, spices, &c. &c.—all of tropical origin. Of all these, the sugar-cane is predominant from Southern to Northern Queensland; bananas are largely grown, and arrowroot to a limited extent, in the South; and cotton, which some years ago was grown on most farms for export, has only lately begun to attract more attention.

We wish to show the value of rice in providing the largest amount of foodstuff in densely-populated tropical and sub-tropical countries, where agriculture is the principal means of livelihood for the mass of the people. True, Queensland is not densely populated—not even sparsely so; neither does rice constitute the principal food of the white population. In all tropical countries, however, rice is the staff of life, and, as a matter of fact, rice is the principal food of about one-half of the whole population of the earth, amongst which we find China with a population of 400,000,000; British India, 300,000,000; Japan, 50,000,000—not to speak of the Dutch East Indies with its swarming native population; and close at hand the British Possession of Papua densely peopled by a rice-eating race. Concerning the latter island, we personally know that the island soil yields excellent rice of many bushels per acre.

The "Papuan Courier" recently (9th July, 1920) quoted from the Annual Government Report of the Central District of Papua, referring to the growing of rice by natives under the supervision of the Yule Island Mission Station, as follows:—"It has been known for some time that the Mekeo district land is adaptable for the production of a very good quality of rice; and for some years the natives, encouraged by Roman Catholic missionaries, have cultivated small areas of rice, with excellent effects. The great drawback to extensive cultivation by the natives is the after difficulty of cleaning the rice; and the primitive method of rubbing it between flat stones is too cumbersome, and entails more continuous labour than the ordinary type of Mekeo native is inclined to give. The Acting Assistant Resident Magistrate, writing on this subject, says:—"It is of importance to note that the Mekeo natives are likely to engage extensively in rice-growing during the coming year. This year they raised about 20 tons of rice, but, believing, as most natives do, in the sufficiency for the day, &c., combined with their proverbial hospitality, their stores of rice vanished rapidly. When the crop was garnered they feasted the whole countryside; and when their guests were leaving, they were supplied with rice for their journey home again. However, this distribution of rice will probably do good, as it will demonstrate to other native tribes the value of rice as a food, and that this food can be easily grown in the district. In fact, a healthy spirit of rivalry has begun amongst them to see who can produce the largest quantity of rice during the coming year, and I have no doubt the result will show a substantial increase on the 20 tons produced this year.' "

Many years ago, when engaged in sugar-growing at Ormeau, Pimpama, we procured some seed (paddy) rice from Japan, and planted it as an experimental crop. It succeeded admirably; and since that time, from the seed thus raised and distributed, other settlers in the district took up the matter of rice-growing, and seed was imported. This seed had not been tested or acclimatised, and the results were not satisfactory. An enterprising German settler (Claus Lahrs) erected a mill for dressing the paddy, but after a few years he gave it up—partly because of the machinery (not being of the best description for dressing rice) doing its work imperfectly, but also because the rice grown by him was not the best variety for table use or suitable for the home market; so the industry, so far as the manufacture was concerned, was allowed to lapse, but the farmers still kept on planting rice, which they cut and used for fodder for their horses and stock, using the seed saved from the crop reaped for resowing the land. The consequence naturally was that the crop had deteriorated with successive plantings through the same seed being used without change.

But three things of great importance had been learned. These were—

- 1st. The suitability of the soil and climate of the Logan district for rice culture.
- 2nd. The proper time at which to sow the seed to ensure success.
- 3rd. The best system of planting and after-treatment of the crop.

There is no more difficulty in growing and harvesting Upland rice than in growing a crop of wheat, barley, or oats. In this connection we cannot do better than reproduce an excellent article on rice-growing by Mr. Fred. W. Peek in 1901, and what he then wrote is just as applicable to the present day:—

The value of rice has also been thoroughly tested as green feed for horses and stock, who eat it greedily and keep in splendid condition when fed upon it. The greatest difficulty in rice culture has been found in procuring the right seed, there being such a large variety of each kind, both with their distinctive flavour, colour, and quality, as well as in the facility with which the crop can be handled and harvested (as I will explain further on) and in the requirements of the merchant, who has his prejudices in favour of certain kinds, which more or less best suit the tastes of the consumer. This has now to a certain extent been overcome, and our farmers are now prepared to carry out this important branch of agricultural industry on sound business lines and with up-to-date methods.

PREPARING THE LAND.

Rice, like every other cereal and vegetable, to ensure good results, must have a certain amount of attention and care in preparing the land, although the question of drainage does not enter so largely into consideration as regards rice as with other cereals, and it, of course, greatly depends as to which variety of rice you intend to cultivate, but stagnant water should be avoided as detrimental. The variety I intend this article to illustrate is the "Aus," or upland rice. I have tried the "Aman" variety as an experiment, but with small success, the chief fault of the latter being the necessity of it being submerged continuously with not less than 2 to 3 inches of water, and, when the crop ripens, the difficulty of harvesting, owing to the grain being so brittle that at the least touch it leaves the ear with a consequent loss of seed. The variety of rice now grown most extensively in the Logan district is known as the "White Java," which gives a length of straw from 4 to 6 feet, with a good flag, besides a grain of good length, fairly plump, and good cropper, and, so far, seems fairly free from disease or rust. Other varieties now being tried are the "China," "Kobe Japan," "Batavia River," and "Italian Upland," of which the White Java and the Italian Upland have, some years ago, been obtained through the medium of the Agricultural Department.

In preparing the land for planting, ordinary methods need only be adopted—that is, to first plough, leaving the soil to lie for a week or so, to aerate and sweeten, then crossplough and harrow, bringing the soil to as fine a tilth as possible. The best time in this district for planting (and I should think it a suitable time for all districts south of Rockhampton) is at the end of September or at the beginning of October, when we get the first rains. In cultivating for rice on hillsides or sloping land with a natural rapid drainage, it would be advantageous to slightly terrace the land crossways to the fall of the hill, leaving an open catchment drain on the higher side, blocked at each end to conserve the rain water, because even so-called upland rice must have a certain amount of moisture, and by the construction of the above drain, or dam so to speak, the gradual percolation of the conserved water will have the desired effect of helping to supply the necessary moisture, which would be about 20 to 30 inches of rainfall spread over the period of growth. This rainfall has produced very good crops of fair yielding grain.

SOWING THE SEED.

In sowing the seed we have to be determined as to our requirements—if for cropping for grain or for fodder purposes only. There are three systems: Broadcast chiefly for fodder purposes, planting in drills, and transplanting from nursery beds. In the first instance—*i.e.*, sowing broadcast—it will take a bushel (60 lb. of paddy) to the acre, the seed being harrowed and treated in the same manner as oats or wheat in the after cultivation. But the plan most generally adopted, and by far the best, is planting the rice in drills 2 feet 6 inches or 3 feet apart, and about 10 to 12 inches between the plants, which may be done successfully with an automatic seeder. By this method, about 35 to 40 lb. seed to the acre are required. It ensures the crop being more even and not so patchy as when sown broadcast, and allows a better chance of going through the crop with hoe or cultivator to remove any weeds that may have made their appearance before the rice has got fairly started. The system of planting in nursery beds and transplanting out is adopted chiefly in planting swamp rice or the "Aman" variety; but, as this system of planting entails a lot of labour, I do not think it will ever come into active operation in this State. The mode of operations with this variety is briefly as follows:—Beds are prepared according to the area to be planted; a bed about 20 feet long and

6 feet wide will be amply large enough to grow plants for a quarter of an acre, the beds being well made and enriched, so as to produce vigorous plants. Sow the seed and rake in carefully, watering at certain intervals. Care must be taken to keep the plants growing. When the plants are about 6 inches high they are ready for transplanting to their permanent beds, which is done by making holes about 10 inches to 1 foot apart in the rows and 2 feet 6 inches between the rows. But, as before pointed out, this is a most tedious and costly mode of planting, and the labour involved is a serious item for consideration. You might as well try to transplant a field of oats or wheat, and expect to get a profit. So that it will be easily seen the planting in drills is at once the most economical and systematic, besides being the one most generally adopted.

HARVESTING THE CROP.

This was a difficult matter to undertake with the rice formerly planted in the Logan district, the China and some of the Japan varieties being so brittle that when ripe the least touch caused the grains to drop off with a consequent loss of seed. This has been happily overcome to a certain extent by the better variety planted. Not only does the White Java give better facility for harvesting, but the straw is of a better colour and quality, of a good length, averaging from 4 feet to 5 feet, and in good land even 6 feet is no unusual length; and no more fair or gratifying sight to the farmer's eyes can be imagined than the rich appearance of a rice field ready for harvesting: this is whilst the stalks have still a bronze-green appearance, the heads have turned a golden brown, about half-way down, and appear what a wheat farmer or an inexperienced person would deem three-parts ripe. The heads of rice, heavy with grain, have a graceful, drooping appearance; as many as thirty to forty heads have been produced from a single grain planted—the product weighing from 10 oz. to 14 oz. By cutting some varieties of rice in this state, the loss is not so great as with over-ripe grain. The cutting is begun in the morning as soon as the dew is off, the rice being bound up into very small bundles, ready to be threshed as soon as possible (which will be explained later on). Rice is never left stooked in the field, but is treated as quickly as possible.

The usual method pursued in harvesting is to cut with the ordinary sickle or reaping-hook, although where large areas are now being planted it is thought that the latest inventions of wheat-harvesting machinery could be used most effectively. A slight alteration in the reaper and binder might be required in the way of lighter and broader wheels on the rich soft rice lands, but otherwise I see no difficulty in the harvesting. At all events, it is the intention of the writer to induce some firm to make a trial at next harvesting as an experiment, and if successful a machine will doubtless be obtained on co-operative lines for the use of the district. After cutting with the sickle, the rice is gathered into bundles and carted into the barn or shed, or, if not sufficiently dry, is left for a day or so to ripen; but this is not often the case, experience having taught our farmers the right time to cut, and it is generally taken to the barn at once for stripping or threshing.

THRESHING THE RICE.

Where there are large quantities, this can be done with the ordinary flail on a threshing-floor, but other systems are in vogue where only small quantities are grown. One plan of threshing is by driving four forks into the ground, about 4 or 5 feet apart in width and 10 or 12 feet long, placing two long saplings lengthways and two crossways. Over these a sheet or tarpaulin is placed to hang and form a sort of long trough. In the centre, resting on the cross pieces, a rough kind of ladder is placed, and the bundles of rice are then beaten over the bars of the ladder, which causes the grain to drop into the bag. Some farmers merely nail a few strips across a box or wooden trough, and beat the rice out on this by handfuls. After the grain is beaten from the straw (it is then known as paddy), the next operation is the winnowing. This is done in an ordinary sieve by letting the grain fall on to a sheet in a light breeze, the sieve being held up at a little distance; its weight causes the sound grain to fall on the sheet, whilst the light grain, bits of straw, &c., are wafted away to one side. The paddy is then carefully collected and placed in the sun, spread out for a few days to get thoroughly dry, when it is bagged and stowed away in a dry barn, or else taken away to the miller for turning into the article of trade and commerce with which we are more familiar, and known as rice and not paddy. The straw, after the grain is threshed out, is spread out to dry or cure, or else it is fed to the stock. A great deal of nutriment remains in the stalk at the time of threshing, and I believe it would make up into a splendid ensilage if desired to be used when other feed is scarce. I should be pleased to hear the results if any of our enterprising farmers will give it a trial.



PLATE 17.—HARVESTING RICE.

MILLING THE RICE AND PREPARING THE CROP FOR MARKET.

This is a most interesting operation, and for the want of the necessary machinery the rice industry has lain dormant for several years in the Logan district. Every credit must be given to Mr. F. W. Peek (the writer of this article) for the energy and enthusiasm he has displayed in reorganising the industry, and the farmers, through the medium of the Logan Farming and Industrial Association, who took the matter up, believing that a great benefit would result to the district if only carried out in a systematic manner. The matter was ably discussed at their meetings. The Agricultural Department was written to for advice, and their assistance was given as far as possible to facilitate the objects sought to be obtained. It was from information supplied by the Department that the farmers were induced to co-operate in the purchase of a new and better variety of seed, a quantity of White Java—900 lb.—being purchased and distributed at first cost among the farmers; next, a small experimental patch was started, the Department supplying rice seed of other varieties, which are now being tested for their producing and milling qualities, the seeds from this source being again redistributed free of charge to those willing to grow them and still further test the various kinds submitted.

With the large increase of area planted, the want of a mill began to make itself felt. The prices offered for Queensland-grown rice were very low, principally owing to no local mills in Southern Queensland being established at that time. Again the Department of Agriculture was appealed to, and the address was obtained of the latest up-to-date firm of manufacturers of rice-milling machinery. This was the Engleburg Huller Co., of Syracuse, U.S.A., who were promptly written to for information, and price lists and catalogues were received from them. A meeting of the farmers was called, and an endeavour was made to get a co-operative mill, but without success, the general opinion being that growing and manufacture were two different branches of the business, and that milling would be better undertaken by a local sugar-miller, who would have the necessary engine power to work the rice-mill at times when the sugar season was over. This was eventually the plan adopted. Mr. Wm. Heck, who owns a sugar-mill on Pimpama Island, sent for and erected the necessary buildings and machinery as an adjunct to the sugar-milling industry. A neat weatherboard structure, the dimensions being 28 feet long, 18 feet wide, and 22 feet high (two story), was erected on stumps to keep the floors dry—an essential in rice-milling operations—a floor being placed about 10 feet high from the basement floor and extending the full length of the building. Upon this floor is erected the Engleburg Huller and Polisher, a neat little machine known as the "No. 4 size," and capable of treating half-a-ton of dressed rice per day. The paddy, being run into the hopper of the machine, falls on to a cylinder which revolves at high speed and most effectually "hulls"—that is, rubs off the cuticle or outer skin—and polishes the grain in one operation. The pollard or residuum from the rice (hulling and polishing) falls on the floor, whilst the grain itself descends to the lower or basement story of the building by means of a shoot which conducts it into a machine placed to receive it, and known as a grader, which is worked and fed automatically from the machine above. There are four sieves or sifters in this grading machine which separate the broken grains, and also the polished rice into first, second, and third quality, the rice being caught in bags or boxes placed to receive it. It is then ordinarily ready for market, but Mr. Heck has added another machine to his mill, known as an improved winnowing machine. This machine, by a series of cogs and cranks, makes the rice pass through another set of sieves, and, at the same time, the wind from a rotary fan contained in the machine and driven at a high velocity clears off any impurities of husk, dust, &c., that may be with the rice after leaving the grading machine, and completes the milling operations by finishing the product in a perfectly clean and highly polished state. Samples of this rice were exhibited at the last National Agricultural Society's Show in Brisbane, and submitted to experts, who expressed themselves as pleased at the improved samples displayed, which were equal to any imported rice of the same variety and very little different from the best Japan.

THE RICE CROP—WILL IT PAY?

This is the question invariably put to the writer whenever advocating the growing of rice as one of the crops to be successfully undertaken in the coastal districts of this State.

In the first place, take the cropping. In ordinary situations, with only fair cultivation, from 30 to 40 bushels of 60 lb. of paddy can be obtained per acre, which is double the wheat yield, the average crop of wheat being from 15 to 20 bushels per acre. I know in some instances these quantities have been exceeded in both crops, but I give a fair average for comparison. The value of wheat per bushel ranges from 3s. to 3s. 6d., whilst the value of rice sold to the local mill averages



PLATE 18.—HEAD OF RICE AND HULLED RICE.
Natural Size.

from 4s. to 5s. per bushel delivered at the mills. Then dry rice chaff is of great value as a feed for stock and horses, and I feel sure, if placed on the market and once fairly tested, it would command a ready sale. The straw is less hard, and, when well dried, compares favourably with oaten straw, and a fairly low estimate would give (according to variety grown) from 3 to 4 tons per acre, of an estimated value of £2 to £3 per ton, or an average to the grower per acre of straw and grain of £15 10s. per six months' crop. Of course, in favoured districts two crops can be obtained in the year—that is, where frosts do not appear. Then the above figures would have to be doubled as a yearly income, but, in the Logan district, only one crop of rice is taken, to be followed by a late crop of some other kind, such as oats, &c. Of course, the greatest benefit is derived by the grower on a large scale if he does his own milling. A glance at the prices paid for paddy and the prices now obtainable for the finished product will be worth consideration. Taking the current prices of rice, at the time of writing, in the Brisbane market, duty paid, best Japan is £24 per ton. The commonest quality of imported rice, "Rangoon," fetches, duty paid, £19. This price gives a fair margin of profit to the local miller if he sells at £18 per ton. The samples being milled this season at the Pimpama Island Mill are of very high grade, and closely resemble "Patna" in shape of grain, but slightly darker in colour. Taking, then, the local rice at £18 per ton market value, to produce which 1 ton 10 cwt. of paddy would be required (according to records taken at recent trials) to be milled, of a value of £12 9s. 9d.; this would leave a margin of £5 10s. 3d. I will add here that paddy rice is bought locally like wheat at 2,240 lb. per ton. Deducting the cost of milling, the average of about £2 per ton leaves the miller a net profit of £3 10s. 3d. per ton. To this must be added the value of the pollard, which also is of great value as feed for calves, pigs, or poultry, when steamed and then mixed with separator milk. Its commercial value is certainly not less than £2 to £3 per ton.

The following is taken from the Brisbane "Observer" of 29th June, 1901:—

"We were to-day shown a sample of rice grown at Pimpama Island, Moreton Bay. It resembles Patna rice in shape of grain, but is darker in colour. Qualified experts who have seen the sample say that it is the first really high-grade rice that they have seen grown in this State, and as it can be marketed at from £18 to £18 10s., should command a ready sale. The commonest quality of imported rice, Rangoon, fetches £19, duty paid, here just now, while for Japan rice £24, duty paid, is asked by the distributing houses."

The price quoted for the mill such as I have described, and which is so constructed that it can be duplicated or extended at a very small cost is, for the No. 4 machine, with a capacity of not less than half-a-ton per day, together with grader, &c., about £130, delivered at Brisbane. Of course, the buildings are extra, and the power required to drive the machinery; but worked in conjunction with any existing sugar-mill, or sawmill, &c., it would prove of great value to the district, and a source of profit on the outlay to any enterprising millowner.

FUTURE PROSPECTS OF THE RICE INDUSTRY.

Like all other crops, rice has its enemies and diseases; it has a kind of rust, smut, &c.; and in some parts of Queensland grubs will take the roots, but up to the present the grub has not caused any trouble in the Logan district. The rust has yet to be dealt with, and I think this will be accomplished by experimenting with various kinds of rice seed till we meet with a rust-resisting variety. It is probable now, that under Federation the importance of rice culture will receive the attention it is worth. A large sum of money is annually expended in importing the product into the Commonwealth States. I would therefore advise all farmers to give rice a fair trial, especially as we are growing varieties that can now be classed as fairly successful on our coast lands, and where a fair average rainfall can be partly depended upon. The value of rice grown simply as fodder to cut green is great for stock feed, the stalks being sweet, juicy, and succulent, and giving a good return per acre, and all stock will eat it with avidity. The question of labour does not enter largely into rice cultivation; as I have pointed out, although a tropical product there is every facility for cultivation by present mechanical methods—that is as far as the "Aus" or upland rice is concerned; the "Aman" or "Boro" varieties being swamp rice needing irrigation I have not yet heard of as being grown to any great extent, and they probably never will be for some time, if at all, owing chiefly to the heavy outlay required for a suitable water supply and an irrigation plant, which can be dispensed with in growing the beforementioned varieties of upland rice, which have proved most suitable for existing conditions and our present agricultural methods of cultivation and harvesting. Of this I am certain, that the rice is one of our coming crops which, together with coffee, will prove of great benefit to this State particularly, and a further source of wealth to our producers. The market for rice

in Australia is a growing one, and it will take years before the supply overtakes the demand. Our farmers need not fear to grow the crop and invest in this industry, which will return a fair amount of profit for the labour and outlay required to produce an article which only requires care in selecting and planting the varieties to suit the market requirements. I am sure the efforts of our producers will be crowned with success, and I shall be pleased with the part I have taken in assisting the modern development of rice cultivation in Queensland.

REGISTRAR-GENERAL'S STATISTICS OF RICE PRODUCTION AND IMPORTATIONS FOR THE YEAR 1900.

Total area planted in Queensland	..	..	..	319 acres.
„ quantity produced (paddy)	..	..	..	9,275 bushels
„ average would equal of clean rice	..	..	..	320,617 lb.
The net imports of rice for 1899 were	..	..	..	9,283,933 lb.
Of the value of .. .. .	..	..	..	£50,099

The above figures represent the position as to production and consumption, and would therefore be about 3.34 per cent. of the total requirements of this State only.

[The total annual production of rice in the United States of America, which, in 1866, was 2,000,000 lb., has now reached 350,000,000 lb. It will take 8,000 large railway cars to handle the crop this season. Rice lands have risen from £2 per acre to £8 per acre; hundreds of miles of irrigation canals have been constructed. Rice has been the redemption of the prairie lands of Texas and Louisiana. In ten years the worthless lands of these two States will produce the world's demand in rice. An acre there produces 20 sacks, worth from 10s. to 16s. per sack. Where are the Queensland farmers in the race?—Ed. *Q.A.J.*]

COFFEE IN QUEENSLAND.

Coffee-growing in Queensland was proved to be a payable proposition many years ago. So far back as 1897, coffee was grown on small areas, and even long before this coffee-growing was carried on successfully at Buderim Mountain by Mr. G. A. Riebe, and the late Mr. A. P. Corrie, Horticulturist at the Queensland Agricultural College, wrote as follows on Mr. Riebe's successful work in connection with this crop. He asked, "Why does coffee culture languish? Why is the coffee-culturist threatened with the fate of going down?" The reason is that there is no adequate demand. The demand is regulated by consumption. Tea is in possession, and possession is nine points of the law, and Queenslanders are inveterate tea drinkers. Between the date of Mr. Corrie's paper on coffee-growing and the present year, however, coffee has been grown on both a small and a large scale, mainly in the North, especially on the Hambleton plantation in the Cairns district, and later on at Kuranda, on the Barron River. The coffee-growers in the latter district were very successful in their operations, and for some years placed on the market a coffee which was even superior to that grown in Brazil or other tropical countries. One of our most up-to-date growers was the late Mr. Bromiley, of Pialba, near Maryborough, and it speaks well for the excellence of his coffee that an offer was received from a British wholesale merchant who had tested the Pialba coffee to give £90 per ton for all Mr. Bromiley's crop. This the latter declined to accept, as he easily disposed of his produce at £100 per ton.

A retrospect of this once fairly flourishing industry in Queensland will serve to show what the capabilities of the State were (and still are) for the successful and lucrative carrying on of a business which ranked high amongst our industries shortly after the appointment of Mr. Howard Newport as Instructor in Coffee Culture.

In 1903 we published a paragraph from "The Grocer and Oil Trade Review" on the coffee industry in Queensland. Coming from such a reliable authority on British trade, coffee-growers of the present day should take heart. After Mr. Newport's arrival in Queensland the coffee-planters so benefited by his experience and advice that we were not surprised to learn that the Queensland coffee rapidly gained in favour in the world's markets, or that the generally high quality was readily acknowledged. The writer of the article said:—

"The area under productive coffee trees in 1901 was 370 acres, and that under non-productive trees, 177 acres; the increase in the productive area was 87 acres. The yield for the year was 130,293 lb. It was in the North that coffee cultivation

was most closely followed. There were, in that division, 472 acres under coffee out of a total for the whole of 547 acres. It is estimated that the present production is equal to 45 per cent. of the requirements.

“In all instances where coffee is being grown and properly cultivated, paying returns are being obtained. The conditions of soil, climate, temperature, and rainfall are eminently suitable for coffee culture in Queensland. The conditions obtaining admit of its successful cultivation on the comparatively level lands, and at all elevations down to sea-level, and give the planters an advantage over those in countries where the higher levels, steep hills, and more inaccessible places have to be sought to obtain the necessary conditions—advantages especially noticeable in the direction of cultivation and transport, and the by no means to be despised advantage of a healthy and congenial climate.

“Cairns, the principal of the coffee-growing centres of North Queensland, comprises both high and low land. The climate is perfect for coffee, the average temperature for the year being from 62 to 65 degrees Fahr., the minimum being about 36 degrees Fahr. and the maximum about 95 degrees Fahr. The rainfall average is 98.34 inches. Several estates on the lower lands, varying in elevation from 50 feet to sea-level, are doing well. The majority of clearings are, however, on the tablelands of the ranges some few miles inland. Kuranda, the central township, is reached by rail from Cairns, after a journey of an hour and a-half through most picturesque scenery. The railway line winds up the range among hills, crossing gorges, and passing waterfalls, reaching an altitude of some 1,100 feet at Kuranda itself. The climate of this tableland is clear, cool, and invigorating. Slight frosts are experienced in winter occasionally in exposed situations, but no trouble is met with in this way upon coffee clearings judiciously selected and carefully opened. The water supply is plentiful, and machinery for coffee curing in several instances is worked by water-power. The quality of the coffee produced here is high. At Kuranda a coffee-grower has opened a factory, and manufactures tins, and disposes of a large proportion of the products of the locality.

“A market for the staple exists in the State, where there are several manufacturers who buy up the coffee in the raw or parchment state. With the federation of the colonies that had been recently effected, a larger market still has been opened to this product of North Queensland, with a protection against the imported article. The consumption of the Australian continent is at present very much in excess of the production and will continue to consume all the local produce for many years. In the open markets of the world the coffee of North Queensland, though only small quantities have as yet been offered, owing to the local demand, is rapidly gaining in favour, and the generally high quality readily acknowledged. For buyers who, having no hulling machinery, desire only the clean bean, there are mills in the town of Cairns where the hulling and cleaning is done at a cost of $\frac{1}{2}$ d. per lb., after which the coffee is worth from 9d. to 1s. per lb., according to grade and quality.”

In 1912 Mr. Newport wrote the following interesting article on

COFFEE CULTURE IN NORTH QUEENSLAND AS IT WAS AND IS.

“The prospects of coffee culture in the tropical parts of Australia, especially Queensland, have materially improved during the past few years. This does not mean that they were really bad at any time; for the conditions of climate and soil have not changed, and are, as they were, in advance of those in nearly every country where coffee is being commercially cultivated. The history of this staple in Queensland shows no exemption from the vicissitudes incidental, and which precedent indicates as unavoidable, to the introduction of an industry to a new country and to conditions that involve some change of method or system from that in general use elsewhere and, therefore, considered orthodox.

“In North Queensland, fifteen to twenty years ago, there was what may be called a boom in coffee—it was a very mild boom; but public opinion looked upon it particularly favourably at the time, and, having no precedent to go by, hoped great things of coffee culture.

“As a matter of fact, the coffee planted in Queensland did do well, and amply proved its suitability, with due adaptation, as an industry for the white-people tropics. In the absence, however, of professional guidance by authorities sufficiently thoroughly acquainted with the natural and life history of the plant to appreciate the bearing on its cultivation the conditions of the new country imposed, initial mistakes were made that, owing to the permanent nature of the product, were irremediable in many instances. Several fairly large plantations were opened—too large for the available labour supply; and numerous small plantings of 100 or 200 trees were made—too small to receive proper attention. Hill sides, steep slopes, and high elevations were chosen because books said such localities were essential—in some other country—

but which only served to increase the cost of production here, where (unlike most other countries) all the conditions necessary for successful cultivation may be found at sea-level and on comparatively flat land. The picking of the crop was not understood either, and was found irksome, because totally different to any kind of harvesting previously undertaken. Finally, the prices fell considerably, and droughts, floods, frost, and ticks drove many settlers temporarily away from their selections, where the little coffee patch, though it, in most instances, thrived and survived these troubles, yet was not of sufficient extent to solely support the settler and his family—and public opinion no longer looked favourably upon it. With the swing of the pendulum coffee-growing became unpopular, not because of any unsuitability of the staple to the country, but because of just such force of circumstances that every industry must meet with periodically. Had the country been more populated, or had the industry been more established, no doubt these difficulties would have been easily met and satisfactorily overcome, as industrial troubles have been, are being, and ever will be.

“Precedent also shows that rises and depressions must and do occur and recur in cycle-like courses, and that, as the metaphorical pendulum swings beyond the normal on one side, so is it inevitable that it shall return. This is now the case with coffee culture in tropical Queensland.

“In discussing the industries possible of establishment in this country, coffee has been quoted as one that has been tried and found unsuitable, or, at any rate, has not been hitherto established to any appreciable extent. One or two abandoned plantations have been cited, and what this or that pioneer in the industry has lost has been quoted; and it is implied that, therefore, coffee culture has not now, and never will have, any prospects of being successfully undertaken here. Those that argue on these lines, however, seldom state the whole facts. They are apt to forget to mention that there are any plantations at all that, having avoided (be it by chance or wisdom) the errors of others, have not merely survived, but are doing well and paying well. They omit to draw any attention to the reasons (generally obvious to those who know) of want of success in any particular instance, and it does not at the time occur to them to mention the small but eloquent fact that the price of the raw article was but little more than half what it is now when cultivation of an abandoned plantation was stopped; also, that, in by far the majority of cases, growers discontinued the cultivation of their coffee for totally different reasons than those of price, labour, or amount of crop return; but that when they had to go, the popularity of the staple having waned, no one was apparently prepared to go on where they left off, even though shown to be payable, and the cultivation of what was considered a ‘fancy’ product simply lapsed.

“At the time of the decline in popularity of coffee in Queensland I have stated that prices fell. This was largely (though not entirely) due to Brazilian over-production at the time, and was not, therefore, confined to Queensland. Raw coffee in Queensland reached its minimum at a value of about 4½lb. per lb. in the parchment. The pendulum in this matter is now slowly but surely swinging, and the prices of coffee all over the world are gradually rising. The present price in North Queensland for parchment coffee is 7½d. to 8d. per lb. Another point omitted is the statement frequently made to me by growers who have a little coffee, to the effect that now they wish they had more; and by a number of those who had small plantations saying that, if only they could start again *now* with the knowledge and experience they have, how perfectly confident they are of the success they could make of it.

“It might be asked where these plantations are that have been referred to as having successfully survived this period of depression and to be now paying so well, and how is it that we hear nothing of them? They exist at Mount Buderim, Mackay (Mount Jukes), Atherton, Kuranda, and are, many of them, giving returns of from 8 to 10 cwt. per acre as an average, and up to 20 cwt. in specially good seasons. Reference to the agricultural statistics as appearing in the last annual report of the Department of Agriculture and Stock (1911) will show that the average returns for the two districts of Mackay and Herberton were 2,304 lb. and 1,046 lb., respectively, per acre; and everyone knows that a district average must include at least a percentage of indifferently worked, as well as the properly worked, plantations. Unfortunately for the country, very little is heard of these successful plantations—not half as much as of the failures. Most of these growers are manufacturing their own coffee and find a ready *local* sale for it, and that within a radius of a few miles only. Their product, therefore, is seldom shipped south to the big markets of the Commonwealth—often not shipped at all, and, while there is an absolute consumption of every iota produced, the amount is insufficient to materially affect the market. Hence Melbourne and Sydney and the South generally know little and hear less of what coffee is being produced.

“This is, I think, sufficient to indicate that as times have advanced conditions have changed, and, as far as coffee culture is concerned, have improved with the

advancement, and that public opinion is recognising this and has good reasons for doing so.

“The want of success in individual instances years ago cannot rightly be taken as any criterion on which to base an assumption that coffee culture is not now worthy of attention. As a matter of fact, if we accept the simile of the pendulum, which is amply corroborated, a period of prosperity for the industry, more or less commensurate with the depression now past, is commencing.

“The main points of difference between coffee culture as a business proposition fifteen years ago and now are—Increased settlement of the country; greater facilities of transport; improvement of prices; a spirit of more open-mindedness, though perhaps greater caution (and, therefore, more business-like and sound), towards the subject; and a fuller knowledge of the requirements of the staple in this country obtained from the experience of the earlier growers.

“I would submit that all these are important factors; but, as the increase in the price of the raw article will probably appeal most strongly, from this point of view, if no other, the subject is worthy of renewed attention and close study, both as a business investment and a means of increasing settlement.

“Let us, therefore, shortly consider the culture of coffee under present-day conditions as a business proposition.

COFFEE CULTURE AS A BUSINESS PROPOSITION.

“It must be admitted that the policy of the country more especially encourages the individual settler producing for himself and by himself. This being so, the large estates and plantations commonly existing in (usually black labour) countries where coffee is grown are not adapted to Queensland, and the plantations must be limited in area practically to what one settler can manage. Let the area then be limited, for the purpose of this paper, to, say, 15 acres.

*“The cost of the opening may be put down at—Land, £5 per acre (outright purchase); falling, £2; clearing, £2; plants, £1; planting, £2; total, £12 per acre; and for 15 acres £180; buildings and machinery necessary for a plantation of this size, £250. Add to the capital the cost of upkeep, until in bearing, one man’s wages at 8s. a day for three years, £375, involving a total investment of a capital of £805. This is an outside estimate, in that new scrub land is allowed for and outright purchase instead of selected Government land and long terms. The capital investment necessary may be very materially reduced by an individual worker in many ways, as, for instance, taking up some of the already cleared and stumped banana land (perfectly suitable for coffee), which would not only probably cost less, but save several pounds per acre in felling and clearing; and by possibly not drawing to the full extent on the 8s. a day set aside as cost of living, inasmuch as a great deal might be produced on the farm to reduce this cost, and in growing catch crops, such as bananas or vegetables, between the coffee during the initial period of waiting; also, the interest accruing on £150 of the £250 set aside for buildings (which would not be required until the estate came into bearing) would be of some assistance during the first three years.

“In the matter of returns the first and possibly second crops would but cover expenses. Once in full bearing and properly opened, an average crop of 10 cwt. per acre may be safely anticipated. With this, as with other staples, its successful production depends very largely on the cost of harvesting; 1d. per lb. is admitted generally as a fair price to pay for the picking of coffee berries. Indeed, it is a high price when it is considered that this amounts to more than half and almost two-thirds of its value; but it were better to overstate than understate this unavoidable item in the production. One penny per lb. means that a man labourer must pick 96 lb. per day to make wages—say, 100 lb.; but the work requires no special strength

*It must, however, be remembered that since Mr. Newport wrote the above the cost of land, labour, provisions, implements, &c., has greatly increased, and taxation, freights, &c., have to be considered. But in some instances, as at Pialba, notwithstanding these increased expenses, coffee planting is yet a paying proposition.

or effort, and is therefore suitable for youths, boys, and girls, who can often earn comparatively high wages. I have already mentioned the record of a boy picking 190 lb. in a day. Ripe coffee berries (or cherry) produce one-fifth to one-fourth of their weight in dry marketable produce called 'parchment.' Let us take the lesser figures, and so leave a still broader margin. A return of 10 cwt. (parchment) per acre would, therefore, involve a cost of harvesting for the whole plantation of not more than £350, and to this must be added the cost of annual upkeep of £125, making a total of £475. The $7\frac{1}{2}$ tons at, say, $7\frac{1}{2}$ d. per lb. would be worth £525, to which must be added the Federal Government bonus of 1d. per lb. of clean coffee, equal to £7 per ton in parchment, amounting to £52 15s., making a total gross annual return of £577 15s., and net returns of £102 15s.

"This, it may be said, discloses no fortune—it does not, but it must be borne in mind that minimum averages rather than maximum returns have been taken, and also that allowance for the living of the grower at 8s. a day has already been made, and the £100 odd means, therefore, *profit*, and represents a rate of interest on the greatest amount of capital invested of some 12 per cent.

"There is no reason why the area under cultivation should not be increased beyond the 15 acres suggested according to the capacity of the settler, more especially if the coffee be grown under shade, reducing the amount of pruning, weeding, and field attention necessary.

"The larger the area the greater the rate of profit, as the cost of the buildings and plant need not increase; but the obtaining of sufficient labour for harvesting would become a matter of some moment if the area were very materially increased.

"The harvesting of a 10-cwt. crop spread over four months would require just over one hand for every 2 acres; so a 10-acre plot, although the total returns are not so large, can often be harvested by the grower's own family.

"To newcomers to the colony with small capital, with or without a family (but especially to the family man), the cultivation of coffee in North Queensland offers excellent investment and prospects of an independent and healthful life in the production of a commodity the market for which is rising as well as increasing locally—a plantation of which, sufficient to return an income of £4 per week, need not exceed an area that the owner can himself manage (with the exception of the harvesting only), and which, once established, requires no replanting, remaining a source of income for the rest of his life."

In the Annual Report of the Department of Agriculture and Stock for 1918-1919, the Under Secretary writes on the subject of coffee-growing:—

"The cultivation of coffee has had a chequered existence in this State, and notwithstanding the excellence of the product the industry, instead of advancing, is steadily declining. The tendency in the tropical part of the State to pay attention to nothing but the cultivation of sugar-cane, and the difficulty in obtaining labour for picking at prices that would enable the profitable production of coffee, are undoubted obstacles; but the fact remains that critics and connoisseurs on the London market have spoken very highly of Queensland-grown coffee. A letter recently received from London describing a meeting at the Royal Colonial Institute upon coffee mentions the opinion of Mr. Farrar, a high authority on choice coffee, who was present, as expressed in the following words:—

" 'He tells me his ambition is to have at one time five bags in one lot of that choice Queensland coffee he lectured upon (a sample sent home to the Agent-General for exhibition purposes), and with that quantity he would so place it that the coffee-growing world would be agog with it.' "

"Such testimony needs no comment, and should have a great effect upon the industry, not, perhaps, in the direction of the establishment of large estates, which would at harvesting time employ a considerable number of people for the picking, but rather in encouraging the cultivation of a few trees on farms as a means of subsidiary profit."

In the year 1918 the production of coffee amounted to 13,129 lb., a decrease of 3,113 lb., as compared with the crop for 1917.

Botany.

ILLUSTRATED NOTES ON THE WEEDS OF QUEENSLAND.

By C. T. WHITE, F.L.S., Government Botanist.

No. 18.

ONION WEED (*ASPHODELUS FISTULOSUS*, Linn.).

Description.—A perennial somewhat fleshy herb. Leaves crowded at the base of the plant; about 1 ft. long, narrow-cylindrical, hollow. Flowering stems 2 or to nearly 3 ft. high, branched in the upper portion, hollow. Flowers in long slender racemes; whitish, a little over $\frac{1}{2}$ -in. across; the six perianth segments each with a dark-coloured midrib. Stamens six, filaments whitish, enclosing the ovary by their concave bases, which, examined under a strong lens, are seen to be papillose on the back; anthers deep orange coloured. Pistil in the centre of the flower consisting of a small green ovary at the base, a comparatively long slender stigma topped by a capitate 3-lobed style. Seed capsule roundish, small (about 2 lines across), 3-valved, the valves when dry and ripe transversely wrinkled. Seeds angular, black, deeply and transversely pitted, 3-6 in each capsule.

Distribution.—A native of the Mediterranean region, now a common weed in many countries. In Australia it occurs in nearly all the States. In Queensland it was first noted about Toowoomba in 1909, specimens being collected by Mr. H. A. Longman and forwarded to the late F. M. Bailey. Since that date it has gradually spread till it has become one of the worst weeds of the Toowoomba district. It has spread to a few other localities on the Darling Downs, but it is not likely to prove a pest in any other than Darling Downs localities.

Common Names.—In Australia it is most commonly known as "Onion Weed," sometimes as "Wild Onion"; but this latter is apt to cause confusion with another weed—*Allium fragrans* or *Nothoscordum fragrans*. Another English name is "Onion-leaved Asphodel."

Uses.—The closely-allied Asiatic *A. tenuifolius* (by most botanists regarded merely as a small form of the European *A. fistulosus*) is largely used in India during times of drought or famine as a human food, and the European and Asiatic plants are so much alike that, as far as properties are concerned, they can be treated as one, and are done so in "The Agricultural Ledger of India," 1902, No. 7, which is devoted to an account of the plant and its uses.

It is there stated that the green plant is cooked as a vegetable, and the ripe seeds gathered and ground into flour. From the bulbs a strong glue suitable for bookbinding, &c., has been prepared; alcohol can also be made from them. In the Paris Exhibition, as far back as 1855, papers and cardboards of various qualities, manufactured from the leaves and stalks of the plant mixed in various proportions with rags and common paper stuff, were exhibited. The seeds contain a good drying oil.

Other Properties.—It is sometimes thought the plant is poisonous, but as it is used so extensively in India as a vegetable this is not likely; but it would no doubt taint the milk of milking cows that happened to feed off it. However, it is one of those plants that is, as a general rule, left more or less untouched by stock.

Eradication.—The best way of treating it is to deal with it before it gets a hold in a locality by forking the plant out, care being taken not to leave any bulbs in the ground. In larger areas it will be found more difficult to deal with, and will probably mean more than one season's work. Where the plants are very thick, spraying with an arsenical solution or other weed-killer might be effective. In dealing with closely-allied plants in America, it has been found practicable to loosen them by ploughing, and by turning pigs on to the loosened soil to eat out the bulbs and fleshy underground parts so exposed. A method that has also been found practicable in pasture land is to turn sheep or goats on to the infested country, salting a number of the tufts from time to time to make the plants more palatable to them.



PLATE 19.—ONION WEED (*Asphodelus fistulosus*).

A. Leaf. A'. Transverse section of leaf. B. Top of flowering stem.
C. Seeds natural size and enlarged.

Entomology.

CANE GRUB INVESTIGATION.

The General Superintendent of the Bureau of Sugar Experiment Stations has received the following report upon Cane Grub Investigations from Dr. J. F. Illingworth, Entomologist to the Bureau:—

“We have been experiencing weather remarkably warm for this season of the year. Then, too, the heavy rains at the end of July, which reached to a depth of 2 ft. in the loose soils at Greenhills, created a condition most favourable for the destruction of the few remaining grubs in the disease areas. The results have been most encouraging, for it is now difficult to find healthy living grubs in what may be termed the old-infested area—i.e., that part of the estate bordering the forest of feeding trees.

“Furthermore, I am pleased to report the establishment of the Tachinid (*Ceromasia sphenophori* Vil.) parasites of the borer beetle in the Babinda area. They are being liberated in other districts.

NOTES ON *LEPIDIOTA ALBOHIRTA* (GREYBACKS).

“As indicated in previous reports, these grubs were very late in their activities this year; hence, at the end of July, I was not surprised to find many of them still feeding in the areas where no disease existed. Normally, at that time of the year, they are all down deep in the soil pupating, or, in some cases, even changed to the adult beetle, waiting for the heavy rains to penetrate and soften the soil so that they can escape from their prison.

DISEASE.

“I have followed up the rapid mortality in the old area at Greenhills, and have carried out numerous laboratory experiments with the two diseases to determine their virulence. Undoubtedly, cool weather is an important factor when combined with moisture. It was very noticeable that the death rate was rapid when the nights were chilly, and fell off almost altogether with the advent of warmer weather.

“In one experiment, I placed thirty-six healthy greyback grubs in a large pot of disease-infested soil from Greenhills. The weather was cool and the mortality rapid. The first week twenty-one had succumbed—fifteen from the bacterial disease and six from the fungus. The second week was somewhat warmer, and ten died—four from bacteria and six from fungus. The third week finished the lot—one dying of bacteria and four of fungus. Hence, in the twenty-one days, 55.5 per cent. died of bacteria and 44.5 per cent. of fungus; total, 100 per cent.

“In other experiments, started later, when the weather had warmed up considerably, the results were far less satisfactory. Apparently a difference of only a few degrees in the temperature makes considerable difference in the virulence of these diseases. On 2nd August I placed nineteen healthy grubs in separate pots of the contaminated soil from Greenhills, watered them well, and set them on a table in a warm, sheltered position in the sun. After a week none was dead; the second week only two died of the fungus. I then removed the pots to a place under the laboratory, 10 degrees cooler, with the result that mortality rapidly increased—most of the deaths being due to the fungus.

“Investigation has been carried on in other localities, in the hope that we might find these diseases widely distributed. Unfortunately, I have not been able to find them anywhere else in the Mulgrave area, though the Muscardine fungus is plentiful further up the line towards Babinda.

“While at Mossman recently, we made a thorough search for dead grubs in the limited areas where the pest appeared this year, but we had no definite results. Only two blackened remains were unearthed, but they were both decomposed and powdery, so it was impossible to say whether the bacterial disease had destroyed them or not.

“The sudden disappearance of the pest at Mossman a few years ago suggests that the grubs might have been wiped out by an epidemic of these diseases. I was hopeful that we might find some diseased grubs as conclusive evidence, but in all of our digging the grubs appeared to be perfectly healthy, except as noted above.

“I am inoculating quantities of soil with the diseased grubs and distributing this to areas where it is not found at present. This will probably prove the most practical method of distributing the contagion. It will be recalled that our efforts at breeding the Muscardine fungus on starchy material gave no apparent results when applied to the grubs in the soil.

"Each dead grub produces literally millions of greyish-green spores, which soon become dry and dusty, so that they will inoculate bushels of soil if thoroughly mixed. It will be best to scatter this soil in furrows as widely as possible in infested fields. I must call attention, however, to the fact that may not be evident at once, that the disease only works under exceptional climatic conditions, such as we have experienced this year; yet the important object is to have the fields inoculated for such occasions when they do occur, for apparently the spores are able to maintain themselves for extended periods where introduced. I draw these conclusions because I have found evidence of the fungus every year in the same fields at Greenhills, though there has been no epidemic until this season.

TACHINID PARASITES OF THE BORER BEETLE.

"While in Babinda on 8th August I learned from Mr. P. C. H. Rutherford that he had just sent in to the mill the last of his cane from the block where I had liberated these parasites on 16th June last year. I went to the millyard at once and located the trucks by looking up the numbers at the weighbridge. I was surprised to find very few borer signs in the ends of the sticks, for the crop was fully 50 tons per acre and very soft—a condition ideal for these beetles; last season it was simply riddled by them. It will not be difficult to imagine my feelings when I found the puparia of the parasites in the first cocoon that I located with my penknife. Further search disclosed them in practically every infested stick that I opened. I found the maggots in the borer grubs, puparia in the cocoons, and even saw newly emerged flies resting on the sticks of cane. This is especially interesting since they must have developed in millions from the twenty flies liberated a year ago.

"It is hard to estimate the value of the assistance rendered by these parasites. Careful figures in Hawaii showed that they brought down the infestation from 30 per cent to 12.77 per cent. shortly after their introduction. On another plantation it was estimated that there was an increase in the sugar content amounting to .98 ton per acre, which would mean 75,000 to 90,000 dollars for a plantation of 1,000 acres. Moreover, the following year, when the flies became better established, this figure was augmented by a further increase of 1.25 tons per acre, which would mean more than double the above annual saving. (Hawaiian Sugar Planters' Ass. Ent. Series, Bulletin No. 13, p. 42.)

"In the region where the flies are established at Moolaba they will have every opportunity to spread, for this is the largest area supplying cane to the Babinda Mill—several blocks of 1,280 acres each are adjoining. Furthermore, the cane in that locality of abundant rainfall is of rank growth, and fully infested with the borers under normal conditions. And, again, it will be an easy matter to extend their range to the Innisfail district, which usually suffers considerably from the pest.

BREEDING PARASITES PROGRESSING AT MERINGA.

"The large cage at the station has been continually stocked with the flies, and colonies have been liberated from time to time in the borer-infested fields along the Mulgrave River. So far we have been unable to find the parasites established here; hence it will probably be well to continue our efforts for a time.

"I had a wire from Mr. Crees, the manager of the Mossman Central Mill, stating that the parasites were abundant in the cane which was being cut on his farm, so I went over and collected as many as possible. Like most insects at this season of the year, the flies had largely emerged. They were sitting about everywhere on the cane leaves, and we found abundant empty puparia. Furthermore, most of the grubs in the fallen cane under the trash were not parasitised. It appears to be the off-season for their activities, since I found fully 90 per cent. of the grubs parasitised in May, at a time when all insect life is active.

THE LINEAR BUGS ACTIVE.

"This new pest of cane (*Phænacantha australica*, Kirkaldy) is exceedingly abundant in many fields in this district, and it appears to be widely spread. I found it was just as prolific at Mossman and, last year, in the Innisfail region. Fortunately, it is a pest which only increases rapidly during the dry part of the year; hence we experience the greatest numbers during the cutting season, at a time when the growth of the cane is not materially interfered with. Nevertheless, when they are in such numbers and all sucking from the under surface of the leaves, they must materially reduce the sugar content, a fact worthy of notice when the cane is sold on relative analysis. Furthermore, if these bugs turned their attention to the young cane they would be a serious menace.

CONTROL MEASURES ADVOCATED.

"This is a pest that multiplies particularly in grassy fields; hence I would advocate clean culture, particularly clean headlands, and, as far as we know at present, firing the trash should help materially in eliminating them. Their close relatives, the Chinch Bugs of the United States, are greatly reduced by these methods."

General Notes.

A REMARKABLE RUBBER DISCOVERY.

A discovery of the highest importance has been made by a lecturer in chemistry at the Manchester (England) School of Technology. When rubber and sulphur are mixed together at a high temperature the rubber becomes hard and tough—"vulcanised" is the technical term for the change. While rubber can stand the necessary heat, other raw materials with which it might be usefully mixed would be destroyed. The new invention is a cold process, in which two gases are used to produce the free sulphur required in vulcanising. When crude rubber, either in the solid or the liquid form, is treated with the two gases it becomes efficiently vulcanised, and when it is mixed with any waste material, such as sawdust, leather scraps, or paper, a similar change takes place without the properties of the waste material being affected. This discovery is to be applied immediately to the manufacture of linoleum, the heavier classes of wallpaper, and artificial leather for upholstery. It is also applicable to the manufacture of one-piece boots (of rubber and leather scrap) and of felt (combining rubber and "shoddy"). There will also be developments in connection with motor tyres.

SOCIETIES, SHOW DATES, Etc.

MACHINE CREEK (*viâ* MOUNT LARCOM).—Machine Creek Dairymen's Association. Secretary: J. C. Jocumsen.

GOOMBOORIAN (*viâ* GYMPIE).—Goomboorian and Ross Creek Branch of the North Coast Fruit Growers' Association. Secretary: J. P. Jackson.

THE PRODUCTION OF MINT FOR ITS OIL.

BY MR. A. J. PINN, Inspector of Agriculture

Peppermint grows most profitably on non-acid peaty soils, but if the moisture is good little trouble will be experienced even on upland soils. There is a large market in this State for both oil and dried leaves, but the crops has never been cultivated to any extent except for supplying mint for the vegetable market.

The crop is propagated from roots and runners from old plantations, and set in rows $3\frac{1}{2}$ feet apart and 4 to 5 inches deep. The roots are carried in a sack over the shoulder, and are dropped into the furrow and covered by scraping the soil with the foot. One acre of old bed will provide sufficient plants for 10 to 20 acres.

Harvesting is done about the time the plant comes into bloom and before the lower leaves drop. The yield of oil is always greatest in hot, dry weather, and heavy rains at harvest time reduce the yield. On large areas the harvesting and curing are somewhat similar to haymaking. The mint may be cut with a mowing machine and allowed to lie in the swath for about a day or longer according to the weather, to allow of the evaporation of excess moisture and wilting of the leaves. The crop is placed in windrows, cocked, and then taken to the still. If the hay is fairly dry, a charge of the still (steam process) should not take longer than thirty to forty minutes, but a damp sample may require two hours.

In the United States, where the crop is extensively grown, two crops are obtained annually, though the second crop is only about half the quantity of the first cut. The conditions under which this crop is usually grown in America are cooler than ours and we should therefore produce more crops. The yield varies from 25 to 80 lb. of peppermint oil per acre, averaging about 40 lb., and about 20 lb. from the second cut. The amount of hay averages 1 to $1\frac{1}{2}$ tons per acre, and if dried after distilling can be fed to farm stock. The plantations are profitable for eight or ten years.

The prevailing prices are 20s. per lb. for spearmint oil and 15s. to 18s. for peppermint. The market for the dried leaves also offers inducements to the prospective peppermint-grower. Leaves at present fetch 2s. 6d. per lb., and the normal pre-war figure ranged round 1s. 3d. The existing supply (as of other dried herbs) is considerably smaller than the demand.—"Agricultural Gazette of N.S.W.," Vol. XXXI., Part 6.

Answers to Correspondents.

PAPER MONEY.

J. C. "DIGGER"—

Although your questions are not on agricultural subjects, we give you the information, as it may be of some interest to our "Digger" readers.

Paper money, according to the historian of the conquest of Granada and Spain, Washington Irving, was first issued by the Count de Tendilla, the Christian governor of the important port of Alhama when that stronghold was besieged by the Moors in 1483, over 400 years ago. Since that date the world has been inundated with paper money.

Field hospitals and surgeons were first heard of in Spain when the Moors were laying waste the country around the ancient city of Antequera, where King Ferdinand of Spain had collected an army of 6,000 horse and 12,000 foot in 1484. Every precaution had been taken to provide this army with all things needful for its extensive and perilous inroad. Numerous surgeons accompanied it to attend to all the sick and wounded without charge, being paid for their services by Queen Isabella, wife of King Ferdinand. The queen also, in her considerate humanity, provided six spacious tents, furnished with beds, and all things necessary for the wounded and infirm. These hospitals afterwards accompanied all the great Spanish expeditions against the Moors, and were called "The Queen's Hospital." Such was the first known introduction of a regular camp hospital in campaigning service.

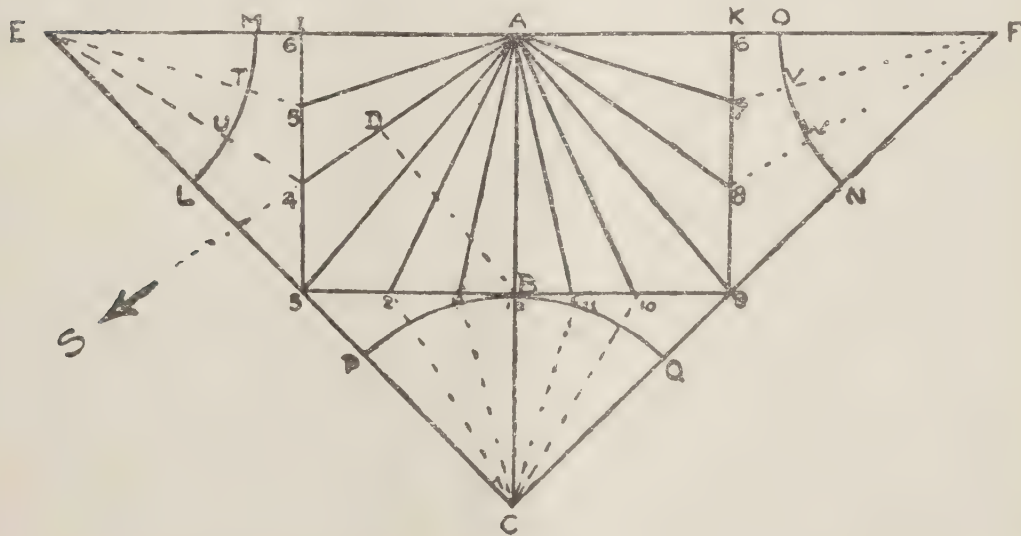
The worthy padre, Fray Antonio Agapida, whose MSS formed the basis of Washington Irving's account of the conquest of Granada, affirms that the first occasion of the use of gunpowder in a mine was the blowing up of the foundation of a tower of the fortification of the city of Malaga by the Christians in 1488.

CONSTRUCTION OF A SUNDIAL.

"NEW CHUM," Belvidere Orchard, Amiens.

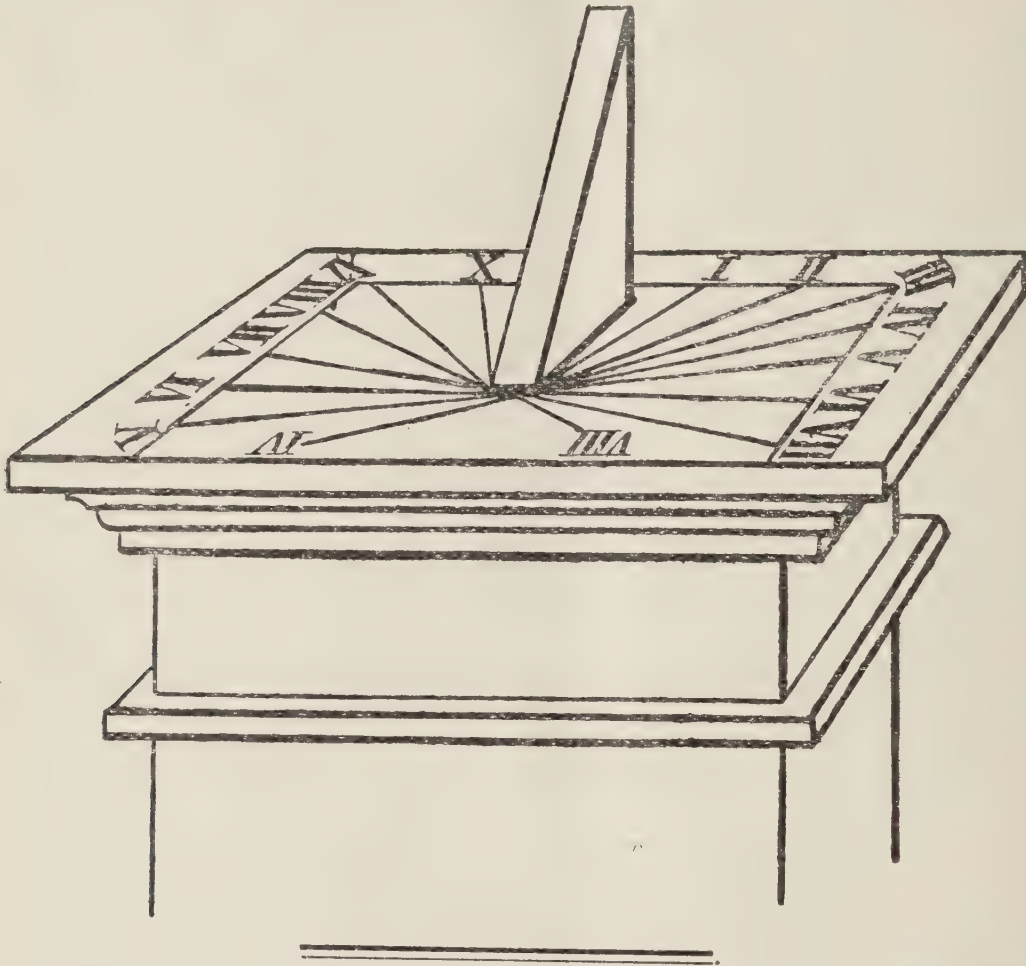
1. Your change of address has been noted.
2. A Sundial is constructed as follows:—

The "style" or pin of the dial, called the "gnomon," shows the hour of the day. This must be 6 inches long—no allowance for thickness. It must be in the vertical plane, and make an angle of 51 degrees 18 minutes with the horizontal plane. The dial plate is laid out this:—Draw EF and AC for 6 and 12 o'clock lines, and make angle CAS equal to the latitude of the place—say this is $57\frac{1}{2}$ degrees. Draw DB at right angles to AS, cutting AC in B. Lay off distance DB from B to C. Make AE and AF equal to AC. Join EC and FC. Through B draw 3B9 parallel with EF.



With centre C through these points, draw C1, C2, C11, C10. With E and F as centres, draw segments ML and ON, and divide each into three equal parts. Through 3 and 9 draw 3I and 9K parallel with AB. From E and F through TU and VW draw E5, E4, and F7, F8. Lastly, from A draw lines to 1, 2, 3, 4, 5, 7, 8, 9, 10, 11, and these will be the hour lines required.

All this trouble can be saved by writing to a mathematical instrument-maker, who will supply you with dialling scale.



SUGAR AND ALCOHOL FROM THE NIPAH PALM.

The Nipah palm (*Nipa fruticans*) is one of the very few tropical plants which occur in pure stands over extensive areas in Borneo. In common with many other palms, its sap contains sugar, and laboratory experiments conducted at the Bureau of Science, Manila, indicate that production of sugar from Nipah palm sap would be a commercial success. According to these experiments it is estimated that there would be at least 12 per cent. of recoverable sugar in the sap, and the average annual yield of 4,000 gallons of sap per acre of Nipah under management should produce about 4,000 lb. of sugar.

Although the production of sugar from the Nipah sap is still in the experimental stage, the manufacture of alcohol from the same source is a well-established industry. For many years the natives of the Philippines have been producing a low grade distillate averaging about 25 per cent. alcohol, which has been used as a beverage. Lately the crude stills which produced this distillate have largely been replaced by modern distilleries, of which seventy-five were in operation in 1913. These produced 2,500,000 gallons of distilled spirits. Over 98 per cent. of this production is diluted and used for beverages, and the balance utilized as fuel for lamps, stoves, and motors.

The Nipah palm grows in dense formation on tidal areas throughout all of the Eastern tropics. Very extensive areas are to be found in Borneo, and the British North Borneo Government estimate that at least 300,000 acres exist at very accessible points throughout their territory. One block of 57,000 acres has already been surveyed on the West Coast and certainly another 100,000 acres can be reached within four hours by launch from Sandakan on the East Coast, and the same can be said as regards Tawau on the East Coast, but further south. Bulletin No. 3 of the Department of Forestry, British North Borneo, discusses the possibilities of establishing this industry in Borneo.—“Agricultural News,” Vol. XVIII, No. 457.

[The Nipah Palm thrives in Papua on most river banks—Ed. “Q.A.J.”]

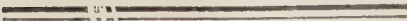
RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF AUGUST IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALLS DURING AUGUST, 1920 AND 1919, FOR COMPARISON.

Divisions and Stations.	AVERAGE RAINFALL.		TOTAL RAINFALL.		Divisions and Stations.	AVERAGE RAINFALL.		TOTAL RAINFALL.	
	Aug.	No. of Years' Records.	Aug., 1920.	Aug., 1919.		Aug.	No. of Years' Records.	Aug., 1920.	Aug., 1919.
<i>North Coast.</i>					<i>South Coast—continued:</i>				
Atherton	In.		In.	In.				In.	In.
Cairns	0·91	19	0·43	0·52	Nambour	2·08	24	1·56	0·85
Cardwell	1·86	38	0·33	0·61	Nanango	1·47	38	2·21	0·96
Cooktown	1·29	48	3·93	0·56	Rockhampton ...	1·00	33	1·52	0·45
Herberton	1·43	44	0·14	0·81	Woodford	1·95	33	1·01	0·66
Ingham	0·68	33	1·41	0·48					
Innisfail	1·43	28	1·50	0·31					
Mossman	6·00	39	2·07	2·55					
Townsville	1·38	12	1·49	0·79					
	0·46	49	1·62	0·03	<i>Darling Downs.</i>				
<i>Central Coast.</i>					Dalby	1·27	50	1·69	0·76
Ayr					Emu Vale	1·25	24	1·53	0·67
Bowen	0·50	33	2·53	0·56	Jimbour	1·33	32	1·69	0·59
Charters Towers ...	0·69	49	2·59	0·23	Miles	1·26	35	1·47	0·61
Mackay	0·52	38	1·35	0·11	Stanthorpe	1·92	47	2·02	0·73
Proserpine	1·04	49	3·27	0·38	Toowoomba	1·81	48	1·89	0·58
St. Lawrence	1·17	17	3·57	0·88	Warwick	1·55	33	1·84	0·98
	0·89	49	2·53	0·21					
<i>South Coast.</i>					<i>Maranoa.</i>				
Biggenden					Roma	0·98	46	1·48	0·53
Bundaberg	1·23	21	0·87	0·84					
Brisbane	1·42	37	1·45	0·48					
Childers	2·19	69	1·16	0·69					
Crohamhurst	1·29	25	1·42	1·17					
Esk	2·43	25	1·39	0·82					
Gayndah	1·66	33	1·54	0·79					
Gympie	1·27	49	1·41	0·94					
Glasshouse M'tains	1·90	50	1·52	0·36					
Kilkivan	1·76	12	0·67	0·99					
Maryborough	1·60	41	1·90	1·14					
	1·80	49	1·90	1·42					
					<i>State Farms, &c.</i>				
					Bungeworgorai ...	0·98	6	1·45	0·47
					Gatton College ...	1·30	21	1·32	0·42
					Gindie	0·79	21	1·32	0·81
					Hermitage	1·50	14	2·06	0·87
					Kairi	1·09	6	...	0·52
					Sugar Experiment				
					Station, Mackay ...	0·91	23	3·21	0·10
					Warren	0·98	6	2·11	0·46

NOTE.—The averages have been compiled from official data during the periods indicated; but the totals or August this year, and for the same period of 1919, having been compiled from telegraphic reports, are subject to revision.

GEORGE G. BOND, State Meteorologist.



SOUTHERN FRUIT MARKETS.

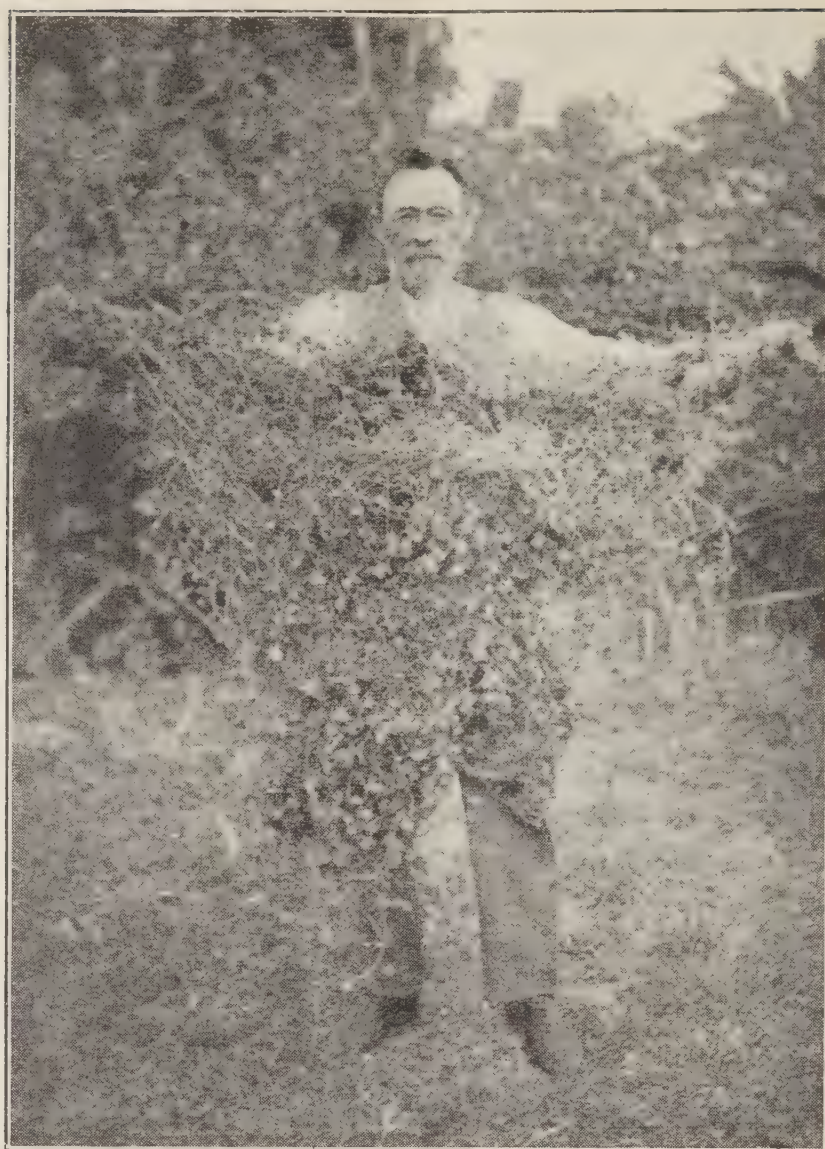
Article.	SEPTEMBER.	
	Prices.	
Bananas (Tweed River), per double case	...	17s. to 26s.
Bananas (Queensland), per double case	...	25s. to 30s.
Bananas (Fiji), per double case
Lemons, per case	...	3s. to 5s.
Mandarins, per case	...	5s. to 12s.
Oranges (common), per bushel case	...	3s. to 8s.
Oranges (Navel), per bushel case	...	6s. to 14s.
Passion Fruit, per bushel case	...	10s. to 15s.
Pineapples (Queens), per double case	...	14s. to 15s.
Pineapples (Ripley), per double case	...	10s. to 12s.
Pineapples (common), per double case	...	3s. to 8s.
Tomatoes, per quarter case

PRICES OF FRUIT—TURBOT STREET MARKETS.

Apples, Eating, per bushel case	...	15s. to 17s. 6d.
Apples, Cooking, per bushel case	...	14s. to 15s.
Bananas (Cavendish), per dozen	...	4d. to 10d.
Bananas (Sugar), per dozen	...	5d. to 6d.
Citrons, per cwt.	...	14s. to 15s.
Cocoanuts, per sack	...	£1 5s.
Cumquats, per quarter case	...	4s. to 5s. 6d.
Custard Apples, per case	...	3s. 6d. to 5s.
Gooseberries (Cape), per quarter case	...	9s. to 12s. 6d.
Gooseberries, per quart	...	9d. to 10d.
Lemons (Lisbon), per quarter case	...	3s. to 5s.
Mandarins, per case	...	10s. to 18s.
Oranges (Seville), per cwt.	...	...
Oranges (Navel), per case	...	12s. to 15s.
Oranges (other), per case	...	4s. to 6s.
Papaw Apples, per case	...	2s. 6d. to 5s. 6d.
Passion Fruit, per half bushel case	...	8s. to 15s.
Peaches	...	...
Pineapples (smooth), per dozen	...	5s. to 8s.
Pineapples (rough), per dozen	...	6s. to 8s.
Strawberries, per dozen boxes	...	4s. to 12s.
Strawberries, per tray	...	...
Tomatoes, per quarter case	...	8s. to 15s.

TOP PRICES, ENOGGERA YARDS, AUGUST, 1920.

Animal.	AUGUST.	
	Prices.	
Bullocks	...	£21 10s. to £34 5s.
Cows	...	£12 10s. to £14 17s. 6d.
Merino Wethers	...	53s. 6d.
Crossbred Wethers	...	50s. 6d.
Merino Ewes	...	45s.
Crossbred Ewes	...	39s.
Lambs	...	39s. 9d.
Pigs (Porkers)	...	101s.



Subterranean Clover.

THIS wonderful Clover is the most nutritious herbage grown. It grows in dry sandy soil and gravelly pastures, and sows itself when once it gets a start. This can be claimed for no other Clover. Splendid for grazing, very fattening. Cattle may run or graze upon this *Trifolium* without harming it.

Subterranean Clover has no equal for the general purposes of excellent feed, pertinacity of reproduction, supply of humus, and charging the soil with nitrogen. It is more economical and effective in providing humus and nitrogen to the soil than any other plant known to the Scientific world. Land sown with it will annually produce a crop from its buried seed pods for many years.

Clean Seed, 7/6 lb. ; 7/- lb. in 14 lb. lots or more ;
6/6 lb. in 28 lb. lots or more.

LAW SOMNER
PTY. LTD.,

SEED AND PLANT MERCHANTS (Established 70 years)
139-141 SWANSTON STREET, MELBOURNE.

Orchard Notes for November.

THE SOUTHERN COAST DISTRICTS.

November is somewhat of an off month for fruit, as the crop of strawberries is about over; pineapples, with the exception of a few off season fruit, are not ready for marketing; and citrus fruits of all sorts, with the exception of those grown in the latest districts, are now over. Bananas should, however, be improving, particularly if the season is favourable.

The most important work of the month is the cultivation of the orchard, as, in order to retain moisture in the soil, it is essential that the soil be kept in a fine state of tilth. Where the land is liable to wash, breaks should be left between the fine-worked land, or, even better, a good break of cowpea or other leguminous crop, valuable for producing nitrogen and humus, should be grown. All fruit pests should be attended to; cyaniding can be carried out where necessary, and is especially useful now in the case of the Red, Purple, Mussel, Circular Black, and Glover Scales. Fruit fly should be systematically fought; all infested plums, peaches, guavas, or other fruits should be gathered and destroyed, so as to prevent the spread of the pest. Sucking bugs of all sorts should be gathered and destroyed, the egg-clusters, as well as the immature and mature insects, being destroyed. Hand-gathering is as good a plan as any. Fig beetles should be destroyed by spraying with Kedzie's mixture; and the egg-clusters should be destroyed whenever found.

Bananas and pineapples can be planted during the month, taking care, in the case of the pineapples, not to set out suckers that will immediately throw out a fruit, but those that will become firmly established before they fruit. Examine the vineyard carefully, and keep it well worked. Look out for Oidium and Black Spot, and treat for same as recommended in the Orchard Notes of the two previous months.

Early ripening grapes will be reaching maturity towards the end of the month; but few, if any, will be ripe. In any case do not market too immature fruit; rather wait a few days longer, till it is fit to eat.

THE TROPICAL COAST DISTRICTS.

The main crop of pineapples will ripen during the month; and if gathered at the right time—viz., when fully developed, but not turned colour—they will carry all right South, if carefully handled and well packed. Papaws and granadillas are still in season, and will meet with a good Southern demand; they must be packed in cases containing only a single layer of fruit, and should be sent in the cool chamber. I am certain that a good market can be got for these fruits in both Melbourne and Sydney, particularly at this time of the year, when their winter fruits are off and their summer fruits are not yet on.

Watch bananas carefully for fly. Keep the orchards well cultivated.

Only ship good mangoes South; for too much rubbish is sent to Brisbane. Good mangoes will pay to pack properly, but the common sorts, which predominate to an enormous extent, will barely pay freight, if there is a good crop. The canning of good types of fibreless mangoes of good flavour is well worth taking up commercially in the North, as a ready sale for the canned fruits can be obtained.

As in the Southern Coast districts, all fruit pests should be systematically fought, and the orchard should be kept in a good state of tilth, as, once the wet season starts, there is little chance of cleaning up weeds and rubbish of all kinds, or of cultivating and sweetening the soil.

THE SOUTHERN AND CENTRAL TABLELANDS.

The earlier kinds of summer fruits, such as cherries, will ripen during the month. See that, if fruit fly makes its appearance, it is systematically fought.

Look out for Codling Moth, and continue the spraying with Kedzie's mixture.

Look out carefully for any San José scale that may have escaped the winter spraying, as, if the trees are sprayed whilst the young are hatching out, the bulk of the insects are killed and little damage is done either to tree or fruit.

The sulphide of soda spray is one of the best to use now. Keep Woolly Aphis in check, should it make its appearance, using the resin washes; or, if it and San José scale are both present, use the sulphide of soda spray.

Watch the vineyards carefully for Black Spot and Oidium. Keep the orchard and vineyard well cultivated, so as to retain all the moisture in the soil required for the growth of the tree and development of the fruit. In the warmer parts, irrigate when necessary, following the irrigation by deep and systematic cultivation.

See that grape vines have plenty of foliage to protect the ripening fruit from sun scald, but yet not so dense a foliage as to induce Oidium or Black Spot. Look out for Red Scale on citrus trees, and cyanide to check same. Look out for fruit fly in the early ripening fruits, and gather and destroy all that may be so affected.

Farm and Garden Notes for November.

FIELD.—Under ordinarily favourable conditions, harvesting the wheat and barley crops may now begin. Those who have oats for hay should cut it when the grain has formed, but before it is ripe, for then the plant is in its most nourishing condition. Destroy caterpillars on tobacco plants, and top the latter so as to throw all the strength into the leaves. Keep down the weeds, which will now try to make headway; earth up any growing crops requiring the operation; sow maize, imphee, setaria, kaffir corn, teosinte, sorghum, cotton, &c. Plant sweet potatoes, sisal hemp, yams, peanuts, and ginger.

KITCHEN GARDEN.—Why do so few gardeners and farmers grow their own vegetables? This is a question frequently asked by visitors to the farming districts. The reason probably is, that vegetables require a good deal of care and attention, which means also a good deal of time taken from the ordinary farm work. In many cases it pays the farmer better to buy many kinds of vegetables than to grow them himself. The only vegetables grown on many fine farms are cabbages and pumpkins, not to class potatoes under the head. Many people have an idea that European vegetables cannot be grown during the hot summer months, but this is a great fallacy; the Chinese gardeners supply the towns with all kinds of vegetables, except, perhaps, cauliflowers, during the whole of the summer. It is, therefore, clear that, by constant work, plenty of manure, water, and some shade for seedlings, most vegetables can be produced during the hot months from November to March. If your ground has been trenched or deeply dug and well worked, the advantages will be seen during the coming months. It does not pay to work shallow-dug ground. When sowing and planting during this month, give plenty of room between the rows and the plants; otherwise they will be drawn up and worthless, and keep the ground open by constant forking and hoeing. Thin out melon and cucumber plants. It is a good plan to peg down the vines; they will then not be blown about by the wind; they will take root at intervals, and thus help the main stalk. Give plenty of water to tomatoes planted out last month. They should also be mulched. Sow cabbage, French beans, melons, lettuce, radishes, pumpkins, cucumbers, marrows, rosellas, &c., and transplant for succession in calm, cloudy weather.

FLOWER GARDEN.—Stake any dahlias which may be now above ground, and plant out the bulbs which were stored in a moist place. If the weaker bulbs are reserved, they will come in for autumn planting. Take up all bulbs which have done flowering, and store them in a dry place. Winter-flowering plants will have gone off almost; still, the garden should be in full bloom, and will well repay the trouble bestowed on it, and a little fertiliser given as a top-dressing will assist the plants to bloom and look well for a longer time than if they were neglected. Give weak liquid manure to chrysanthemums, and allow no suckers to grow till the plants have done flowering. Take up narcissi. Do not store them, but plant them at once in new situations. Sow antirrhinum, balsam, zinnia, summer chrysanthemum, calliopsis, and nemophila.

SEED TESTING.

Samples of any seeds purchased or offered for sale as seeds for sowing may be sent to the Department of Agriculture and Stock for analysis.

WEIGHT OF SAMPLE TO MAIL.

Wheat, Oats, Barley, Maize, Rice, Rye, Peas, Cowpeas, Beans, Tares	8 oz.
Millet, Sorghum, Sudan Grass, Panicum, Buckwheat, Lucerne, Clover, Linseed	4 oz.
Rhodes, Paspalum	2 oz.
Turnip, Cabbage, Parsnip, Carrot, and Vegetable Seeds of like size	$\frac{1}{2}$ oz.
All Seeds other than those included above	2 oz.
Vegetable Seeds in made-up packets	3 packets

When drawing a sample be careful to obtain a quantity from the top, bottom, and middle of each bag. These should be thoroughly mixed to ensure the sample being uniform.

The name of the seed, with name and full address of the sender, should be on every sample.

If the result of the test is required for purposes of sale, a fee of 2s. 6d. per sample will be charged.

No charge will be made to Farmers sending in samples of the seed that they have purchased as seed for sowing, providing the following particulars are given:—

Vendor's name and address.

Name of seed.

Quantity purchased.

Date of delivery.

Locality where seed is to be sown.

Name and address of purchaser.

Samples, with covering letter, should be addressed to—

UNDER SECRETARY,

DEPARTMENT OF AGRICULTURE AND STOCK,

BRISBANE.

ASTRONOMICAL DATA FOR QUEENSLAND.

TIMES COMPUTED BY D. EGLINTON, F.R.A.S.

TIMES OF SUNRISE AND SUNSET. **AT BRISBANE.**

1920.	SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		PHASES OF THE MOON, ECLIPSES, &c.
Date.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.	
1	6.1	5.35	5.29	5.47	4.59	6.5	4.46	6.28	(The times stated are for Queensland, New South Wales, and Victoria).
2	6.0	5.35	5.28	5.48	4.58	6.6	4.46	6.29	
3	5.59	5.36	5.27	5.49	4.57	6.6	4.46	6.30	H. M. 6 Sept. ☾ Last Quarter 5 5 a.m.
4	5.58	5.36	5.26	5.49	4.57	6.7	4.46	6.31	
5	5.57	5.37	5.24	5.50	4.56	6.8	4.46	6.32	12 " ☉ New Moon 10 52 p.m.
6	5.56	5.37	5.23	5.50	4.55	6.9	4.46	6.33	20 " ☾ First Quarter 2 55 p.m.
7	5.55	5.37	5.22	5.50	4.55	6.9	4.46	6.33	28 " ○ Full Moon 11 57 a.m.
8	5.54	5.37	5.21	5.51	4.54	6.10	4.47	6.34	Perigee on 9th at 8.12 a.m. Apogee on 21st at 8.42 a.m.
9	5.53	5.38	5.20	5.51	4.53	6.10	4.47	6.34	5 Oct. ☾ Last Quarter 10 54 a.m.
10	5.52	5.38	5.19	5.51	4.52	6.11	4.47	6.35	12 " ☉ New Moon 10 50 a.m.
11	5.50	5.38	5.17	5.52	4.52	6.12	4.47	6.35	20 " ☾ First Quarter 10 30 a.m.
12	5.49	5.39	5.16	5.52	4.51	6.13	4.48	6.36	28 " ○ Full Moon 12 9 a.m.
13	5.48	5.39	5.15	5.53	4.51	6.14	4.48	6.36	Perigee on 4th at 7.54 p.m. and 31st at 12.26 a.m. Apogee on 19th at 4.42 a.m.
14	5.47	5.40	5.14	5.54	4.50	6.15	4.48	6.37	A Total Eclipse of the Moon will occur on the night of the 27th, commencing about 11.30. An hour earlier it will be entering the dark shadow of the earth.
15	5.46	5.40	5.13	5.55	4.50	6.16	4.49	6.37	
16	5.45	5.41	5.12	5.55	4.49	6.17	4.49	6.38	
17	5.44	5.41	5.11	5.56	4.49	6.18	4.49	6.38	3 Nov. ☾ Last Quarter 5 35 p.m.
18	5.43	5.42	5.10	5.56	4.48	6.18	4.50	6.39	11 " ☉ New Moon 2 5 a.m.
19	5.42	5.42	5.9	5.57	4.48	6.19	4.50	6.39	19 " ☾ First Quarter 6 13 a.m.
20	5.41	5.43	5.8	5.58	4.48	6.20	4.50	6.40	26 " ○ Full Moon 11 42 a.m.
21	5.40	5.43	5.7	5.59	4.48	6.21	4.51	6.40	Apogee on 16th at 12.18 a.m. Perigee on 27th at midnight. The Moon will cause a partial eclipse of the Sun during the night of the 10th, visible only on the other side of the world, including Great Britain and Ireland.
22	5.39	5.43	5.6	5.59	4.48	6.21	4.51	6.41	
23	5.38	5.44	5.5	6.0	4.48	6.22	4.52	6.41	
24	5.37	5.44	5.4	6.0	4.47	6.22	4.52	6.42	
25	5.36	5.44	5.4	6.1	4.47	6.23	4.53	6.43	3 Dec. ☾ Last Quarter 2 29 a.m.
26	5.34	5.45	5.3	6.1	4.47	6.24	4.53	6.43	10 " ☉ New Moon 8 4 p.m.
27	5.33	5.45	5.2	6.2	4.47	6.24	4.54	6.44	19 " ☾ First Quarter 12 40 a.m.
28	5.32	5.45	5.1	6.2	4.47	6.25	4.54	6.44	25 " ○ Full Moon 10 39 p.m.
29	5.31	5.46	5.0	6.3	4.47	6.26	4.55	6.45	Apogee on 13th at 3.30 p.m. Perigee on 26th at 10.24 a.m.
30	5.30	5.46	5.0	6.3	4.47	6.27	4.56	6.45	
31	...	...	4.59	6.4	...	...	4.57	6.45	

For places west of Brisbane, but nearly on the same parallel of latitude—27½ degrees S.—add 4 minutes for each degree of longitude. For example, at Toowoomba the sun would rise about 4 minutes later than at Brisbane if it were not for its higher elevation, and at Oontoo (longitude 141 degrees E.) about 48 minutes later.

At St. George, Cunnamulla, and Thargomindah the times of sunrise and sunset will be about 18 m., 30 m., and 38 minutes respectively, later than at Brisbane.

At Roma the times of sunrise and sunset may be roughly arrived at by adding 16 minutes to those given for Brisbane, but an allowance of 3 or 4 minutes more is sometimes necessary.

The moonlight nights for each month can best be ascertained by noticing the dates when the moon will be in the first quarter and when full. In the latter case the moon will rise somewhat about the time the sun sets, and the moonlight then extends all through the night; when at the first quarter the moon rises somewhere about six hours before the sun sets, and it is moonlight only till about midnight. After full moon it will be later each evening before it rises, and when in the last quarter it will not generally rise till after midnight.

It must be remembered that the times referred to are only roughly approximate, as the relative positions of the sun and moon vary considerably.

[All the particulars on this page were computed for this Journal, and should not be reproduced without acknowledgment.]

IRRIGATED EDUCATION

A College Education has become necessary to secure any worth while position.

In CITY OFFICES positions are available for those who can do the work. The preparation includes Shorthand, Typewriting, Bookkeeping, Business Practice, Filing and Card Systems. Wages are high for those who are qualified.

In WAREHOUSES, shop assistants are in demand. Men are getting from £5 per week to considerably larger sums according to their training and consequent ability. Tailoring and Tailor Cutting are first-class occupations. Numerous other courses are in operation for various vocations.

FOR SKILLED LABOUR. The demand upon us is more than we can supply. No matter how many students we train still there is a shortage. Two students have just gone out at £6 and £8 respectively.

YOU CAN BE TRAINED to take your place equally with others, by correspondence. There is no need to live in the city. Write to Bradshaw's and state what you would like to do, what you now are, and what education you have had. They will advise you, send you particulars of the courses they suggest, teach you by post, and recommend you for a position at more than ordinary wages.

Get these thoughts running through your mind
and channel direct to the Reservoir of
BUSINESS EFFICIENCY

WRITE TO-DAY for full details and Pamphlet P32

BRADSHAW'S BUSINESS
COLLEGE
PTY., LTD.

240-50 FLINDERS STREET, MELBOURNE, VIC.

RECORD PRICES OF STOCK.

MONARO BEEF CATTLE.

Dalgety and Company effected a record sale of fat cattle at the Homebush yards a few weeks ago. The cattle were of great weight and quality, from the Bibbenluke Estate, Monaro. They arrived in excellent condition. Three bullocks were first brought under the hammer. One was sold at £70, the second at £69 1s., and the third at £61 11s. The three averaged £66 17s. 6d. each. Six cows were then offered. The first brought £47 11s., the second £46 16s., and the other four were sold at £34 6s. each. Six steers were then sold at £33 11s. each. The fifteen head of cattle realised a total of £627 9s., or an average of £41 16s. 7d. They were station-bred Shorthorns, about 7 years old, and were in first-class condition. There was a good deal of speculation at the yards as to the weight of the three bullocks. The heaviest ox was estimated to weight between 1,700 and 1,800 pounds, and the average weight of the three set down at about 1,600 lb. each.

SUNFLOWER SILAGE.

In the last issue of the Journal we published some notes by J. F. Keane, Cairns district, on the value of the sunflower as a fodder for stock and as a valuable oil producer. The Perth "Farmer," W.A., in the issue of 5th September, contains the following description of experiments made in Montana (U.S.A.) to ascertain the relative values of sunflower silage and lucerne and other crops as fodder for dairy cattle:—

"For many years past experiments have been carried out at the Montana State College, and the director stated recently that sunflower silage had proved an excellent food for cattle, especially dairy stock, as not only did it possess great milk-producing qualities, but the yield per acre was far in excess of either lucerne or Timothy grass.

"On the farm of Mr. W. M. McDowell, Lieut.-Governor of Montana, last season an area of five acres was sown with sunflower of the Russian variety. Some details of the results were published in a recent issue of the 'Country Gentleman.' The plants stood 6 feet to 8 feet tall as a general average, though some plants reached 15 feet in height. The cost of the seed per acre was about 16s. 8d., and the cost of ploughing and harrowing was an extra 20s. per acre. The ground had been prepared in May, and seeded in June.

"The sunflowers grew in rows 30 inches apart and were about 6 inches apart in the rows, and during the growing season the plants were cultivated between the rows just as corn would be. The summer of 1919 was unusually dry in Montana, and a little irrigation was used. A good supply of water caused the sunflowers to grow larger, but it has been said that they can be raised on what is commonly known as dry land.

"In cutting, Mr. McDowell used a corn knife. The plants were cut as near to the ground as possible, because every part of the stalk was wanted for silage. The harvesting operation was very simple and necessitated the employment of only six men. Two of them cut the plants, and another two hauled the sunflowers in wagons to the silo, one fed the chopper, and the sixth played a hose on the sunflowers as they passed through the chopper. The 5 acres was cut, harvested, chopped, and deposited in the silo in six days, or 48 hours of actual work.

"The general method of using the sunflowers for silage was to cut them green and to prepare them at once for the silo, although farmers that did not have a silo had obtained very satisfactory results by cutting them green and stooking them.

"At the current prices in Montana last season the sunflower was worth £80 per acre, as compared with £24 per acre for lucerne, and £14 for Timothy grass.

"Commenting upon these results, Mr. McDowell said that by growing sunflowers a farmer could winter twice as many cattle as he could by raising lucerne, clover, rye, barley, redtop, or any of the ordinary grasses or crops that were raised for cattle feed in Montana."

Queensland.

Department of Agriculture and Stock.

Volume XIV.



NOVEMBER, 1920.

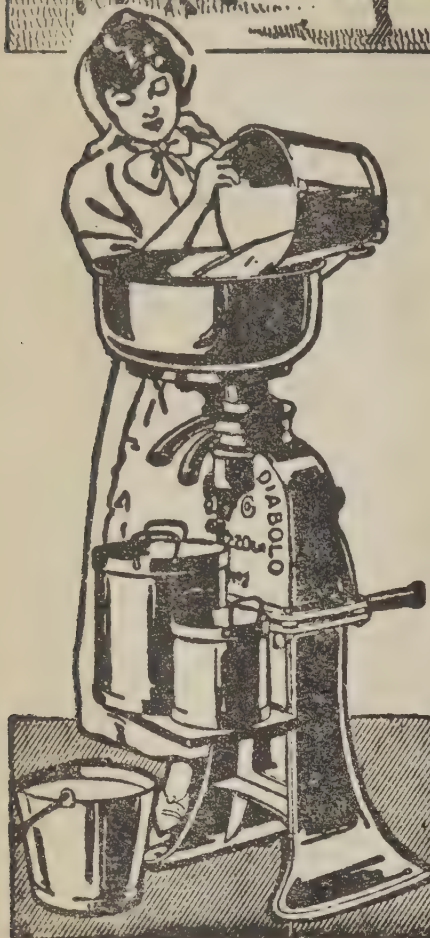
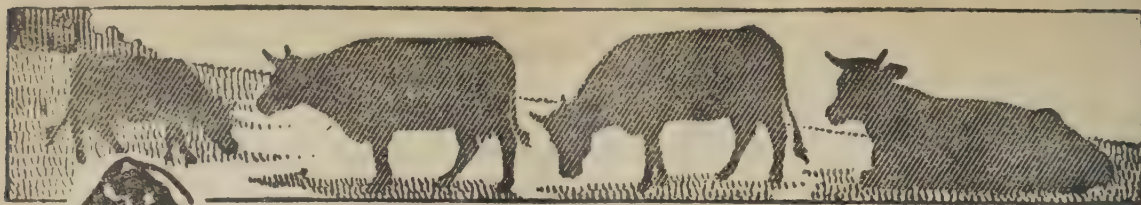
Queensland Agricultural — Journal. —



REGISTERED AT THE GENERAL POST OFFICE, BRISBANE,
FOR TRANSMISSION BY POST AS A NEWSPAPER.

Edited by
A. J. BOYD, F.R.G.S.Q.

Protect Your Dairy Profits!



No Farmer can afford to be without
a Good Cream Separator!

Buy the "**DIABOLO**" and not only save the
first cost, but save time and labour in operating.

Do your skimming faster and better.

CHOOSE THE SEPARATOR WITH THE
BIGGEST REPUTATION IN THE WORLD—
THE "**DIABOLO**"—IT IS A PROVED
PROFIT MAKER FOR THE FARMER.

ONE MONTH'S FREE TRIAL!

Communicate with us right away.

DIABOLO
CREAM SEPARATOR CO.
138-140 CREEK ST BRISBANE

SEEDS !

THERE is satisfaction in sowing seeds that will give abundant crops.
This is what you want, is it not? Then sow **TAYLOR'S SEEDS**.
Success in Farming is influenced by many factors such as weather,
soil, method of cultivation, etc., but **PURE SEED** is the first rung on
the ladder of success on the farm.

BIGGER CORN CROPS

are assured if you plant **TAYLOR'S SEED MAIZE**. Our New Season's
stock of Seed Maize has just arrived, and includes all the leading varieties.
Can we quote you? All samples are of good germinating quality.

FODDER CROP SEEDS.

For present planting we have Imphee, Panicum, Amber Cane, Sorghum,
Japanese Millet, Rhodes Grass, Paspalum, Couch Grass, and last, but by
no means least,

SUDAN GRASS SEED.

If you live in a dry district you really cannot afford to be without **Sudan**, as
its drought-resisting qualities are well proved. It is also a prolific yielder,
and a nutritious food for all kinds of stock.

We also have good stocks of **VEGETABLE AND FLOWER SEEDS** of all
kinds—for the farm, flower garden, and vegetable garden. Sold in packets,
from 3d. each upwards, also in bulk.

CHAS. TAYLOR & CO.,

"The Leading Seedsmen,"

—124-130 ROMA STREET, BRISBANE.—

VOL. XIV., PART 5.]

[NOVEMBER, 1920

Registered at the General Post Office for Transmission by Post as a Newspaper.]



THE
QUEENSLAND AGRICULTURAL JOURNAL,

ISSUED BY DIRECTION OF

THE HON. THE SECRETARY FOR AGRICULTURE.

EDITED BY A. J. BOYD F.R.G.S.Q.

VOL. XIV. PART 5.

NOVEMBER.

By Authority:

ANTHONY JAMES CUMMING, GOVERNMENT PRINTER, BRISBANE

1920.

We are Bag Specialists

For Farmers For Farmers For Farmers

Bags for Wheat, Maize, Chaff, Peas, Beans, etc.
Any sort or kind. New or Second Hand.

**For Storekeepers, Meat Exporters, Flour
———Millers, Bacon Curers, etc.———**

All kinds of HESSIAN and CALICO BAGS
———Printed to your own design.———

For Packing, Signwriting, Plastering, etc.
HESSIAN & CALICO all widths & grades.

Joyce Bros. (Q.) Limited,
Stanley Street, South Brisbane.

The Dairyman cannot be without Fodder !

*It is essential to sow at the right
time to ensure a good winter crop.*

Sow Petersen's Seeds and obtain the best results.

SACCALINE

Makes excellent Fodder for Cattle feed, grows similar to
Planters Friend; sow in drills, 20 lbs. acre. Price,

SOUDAN GRASS

One of the most valuable of forage plants, its nutritive value
compared with other fodders is unexcelled. Sow 10 lbs. to the
acre. Price, 2s. per lb.

GIANT HONDURAS SORGHUM

This is a new variety of Sorghum, it stands both drought and
frost, most valuable as a green fodder. 1s. per packet.

MAURITIUS BEANS

Highly recommended for green manuring. 32/6 per bushel.

COW PEAS

Another valuable crop for ploughing in for green manure.
Price on application.

JAPANESE MILLET

One of the finest fodders, rapid growth, yields enormous
quantities of green fodder. Price on application.

Write for our large illustrated Catalogue, Dahlia and Chrysanthemum Lists.

H. A. Petersen Ltd., 357-359 George Street, Brisbane

CONTENTS.

	PAGE.		PAGE.
AGRICULTURE—		BOTANY—	
Pisé Buildings for Farmers	213	Illustrated Notes on the Weeds of Queensland, No. 19 (C. T. White, F.L.S.)	243
Farmyard Manure: Its Making and Use	214	ENTOMOLOGY—	
The Canadian Province of Alberta	217	Cane Grub Investigation	245
Cotton Prospects	219	GENERAL NOTES—	
Cotton Situation—Factors that Count	220	Societies, Show Dates, &c.	247
PASTORAL—		Erratum—Imports of Coffee	247
Blowfly Maggots: Important Dis- covery	222	How to Destroy Ants	247
PLANTATION FUTURES	222	ANSWERS TO CORRESPONDENTS—	
DAIRYING—		Cement for Floor	247
Feeding Pigs on Dried Blood	223	Cream and Butter	247
TAKING WATER OUT OF FRUIT	223	THE MARKETS—	
POULTRY—		Prices of Farm Produce in the Brisbane Markets for October, 1920	248
Report on Egg-laying Competition, Queensland Agricultural College, September, 1920	224	Vegetables—Turbot Street Markets	248
Poultry Conference	228	Southern Fruit Markets	249
THE HORSE—		Prices of Fruit—Turbot Street Markets	249
The Suffolk Punch	236	Top Prices, Enoggera Yards, September, 1920	249
THE ORCHARD—		FARM AND GARDEN NOTES FOR DECEMBER	251
Citrus Growing in California	237	ORCHARD NOTES FOR DECEMBER	251
Eradication of White-wax Scale	238	SEED TESTING	253
TO GLAZE A CEMENT BARREL	238	ASTRONOMICAL DATA FOR QUEENSLAND	254
TROPICAL INDUSTRIES—		RAINFALL IN THE AGRICULTURAL DISTRICTS	256
Experiments with a New Cactus Rubber (E. S. Long)	239	DEPARTMENTAL ANNOUNCEMENTS	xvii.
Root Disease of Cacao	241		
INTERSTATE SPECIAL FRUIT TRAINS	242		

Large Melon & other seeds at 1/- per packet each

WATER MELONS—Black Diamond, Oh My! Colossus, Mammoth Chilian and Duke Jones (50 to 90 lbs. each).

ROCK MELONS—Montreal Market (has weighed up to 44 lbs.), California Giant and General Grant (20 lbs. each), and the Bush or Vineless Musk Melon.

TOMATOES—American Mammoth (5 lbs.), Logan's Giant (3½ lbs.), Annual Giant Tree (3½ lbs.), Majestic, Giant Beauty, Snow Ball (white), and Peruvian Tree Tomato.

CASABA MELONS—A species of Rock Melon. Golden Beauty, Pine-apple, Hybrid, White African, and Santa Claus.

CUCUMBER—Everlasting, Mammoth, and Ivory.

THE WONDER BERRY & GARDEN HUCKLEBERRY for pies or preserve. Climbing Rock and Water Melons. Algaroba Fodder Bean and Carob Bean Trees.

TOBACCO SEED—Connecticut, Blue Pryor, Virginia, Havanna, and White Stem.

All ordinary Vegetable and Flower Seeds, etc., at 6d. per packet each.

B. Harrison, Burringbar, P.O., New South Wales.



**Look
This
Way!**

FOR MEN OF ACTION
WE READILY RECOMMEND

The **Santwill**
WORK SHIRT

Sand in Color. Twill in Quality

"SANTWILL" is a new two-pocket Work Shirt. Light medium weight and sand colored—a new color that will not show the dust, in a cotton quality that will outwear two of most other Shirts. You'll like its honest, broad-shouldered comfort. Cut full, not "skimped." The toughest Working Shirt made.

9/6 each, or 3 for 27/-

Carriage Paid Everywhere!

Pike Brothers

Brisbane

Limited

TOWNSVILLE
TOOWOOMBA

QUEENSLAND AGRICULTURAL JOURNAL

VOL. XIV.

NOVEMBER, 1920.

PART 5.

Agriculture.

PISÉ BUILDINGS FOR FARMERS.

Some three years ago we published an article on the building of houses, the walls of which, instead of being constructed of bricks, stone, or wood, are composed of the soil alone. The "Daily Mail" (1st October, 1920) drew attention to this form of house-building. The estimated cost of building timber at the present time renders the building of houses on the farm so expensive that it constitutes a heavy tax on the new selector. The following description of the "Pisé" building, as given in the issue of this Journal in January, 1917, deserves the consideration of new settlers on the land. The "Daily Mail" says that forty ex-army officers are building houses of compressed earth at Hornchurch, Essex, and the experiment is proving a great success. No substance whatever except normally moist earth is used, but the result is a sound, weather-proof structure. Why, then, incur an outlay of from £300 to £600 for a farm house which can be built out of the soil?

"Having taken up a selection either for farming or grazing, the settler in the old days of the 'colony' of Queensland, forty or fifty years ago, either rigged up a tent for his first home, or, if in a locality where there was plenty of splitting timber or tea-tree, he rose to the dignity of a humpy of low log walls roofed with tea-tree bark, or stripped some sheets of stringy bark and built a bark hut; later on, perhaps, he split slabs and shingles, and dwelt in a fairly comfortable house. In the primeval scrub or forest, this question of housing himself, and perhaps his family, was easily solved. But it was otherwise when the farm happened to be situated on the plains. Then it meant either continuous tent life, or, as the alternative, a galvanised iron or a sawn timber structure, both very expensive in the pre-railway days. Yet, all the time on the treeless plain, all the materials were at hand for the construction of a comfortable weather-proof house, warm in winter, cool in summer, which could be erected by the farmer himself, the only tools needed being a pick, shovel, and rammer, and half a dozen planks.

"The material for the construction of the walls, chimney, and flooring was the soil itself. All that the settler need do is to dig out the soil and shovel it into rough wooden moulds, ramming it down solid in layers of 4 or 6 in. When the mould or box is full and well rammed, it is taken to pieces and erected on another portion of the building, and the work proceeds until the walls and partitions are completed. Any inexperienced man can thus construct a comfortable dwelling, as the actual pisé work presents so little difficulty that it can be done by anyone who has sufficient strength to shovel earth and wield a rammer, and is careful to see that the moulds or

boxes into which the soil is shovelled are kept plumb and in straight lines. The services of a carpenter, unless the settler has some knowledge of that trade, will be found necessary to make doors and window-frames and construct the roof, and see that these are set correctly and in their proper places.

"The whole process is well described in the 'Agricultural Gazette of New South Wales' by Mr. G. L. Sutton, Cowra Experimental Farm, 2nd May, 1907.

"In some of the South American States there are numbers of such buildings constructed either of rammed soil or of adobé or sun-dried bricks (for which material like clay can be used), which is unsuitable for pisé work. For the latter, almost any soil containing a fair amount of loam is suitable; but a pipeclay loam, with which gravel is intermixed, is best. Soil which cakes after a heavy rain, or which, if ploughed or dug when dry, turns up in hard clods, is very suitable. Any vegetation growing on the surface of the earth selected must be removed, as also should any roots, bits of stick, or vegetable matter likely to decay. The earth is best used as it is dug, and, if too dry, should be brought to the correct moist condition by watering it about two days before it is to be used. The earth should be just moist enough to be crumbly, and yet adhesive enough to retain the impression of the fingers when pressed in the hand.

"We have culled the above preliminary notes on pisé building from Mr. Sutton's exhaustive description in the abovenamed 'Gazette.' It is stated that pisé buildings are much cooler than buildings constructed with solid brick walls. Some idea may be formed of the durability of pisé by the fact that there is at present, at North Logan, a stable built of pisé which has been in constant use for over sixty years, and which is to-day in good order, notwithstanding the fact that the external walls are unprotected from the weather. Pisé buildings are said to have a life of 150 years.

"It is, however, advisable to protect the walls from moisture, especially from rain, which should be guarded against by surrounding the building with verandas or by overhanging eaves. Pisé buildings not so protected are, however, very common."

FARMYARD MANURE: ITS MAKING AND USE.*

Not many years ago it used to be the custom for certain representatives of agricultural science to extol the virtues of artificial manures, while farmers, on the other hand, stoutly maintained the superiority of farmyard manure. In recent years the position has changed. It is now the scientific worker who emphasises the importance of farmyard manure and the need for making and storing it properly. Farmyard manure and artificial fertilisers do not compete with one another; they serve quite different purposes in the soil. No farmer can do without artificials, no matter how much farmyard manure he may have at his disposal, and, conversely, no arable farmer, except in a few special districts, would like to do without farmyard manure, even if he could have unlimited supplies of artificials at very low prices. The best results are always obtained on arable land by proper combinations of farmyard and artificial manures, although on grazing land farmyard manure may not act well.

So far as is at present known, the effects produced by farmyard manure in the soil are three:—

1. To supply nitrogen and potash to the plant.
2. To improve the physical condition of the soil, and thus increase its capacity for going into a good tilth and for holding water. The effect of this is to steady the yield.
3. To assist some of the micro-organisms of the soil; among other effects, to benefit the clover crop.

Only in the first of these is there any competition with artificial fertilisers, and even here the competition is restricted, because artificials usually exert their full action on the crop to which they are applied, while farmyard manure does not.

THE CONSTITUENTS OF FARMYARD MANURE.

1. *The Excretions.*—The animal excretions constitute an important part of the fertilising material of farmyard manure. The urine is by far the most important—

* Reprint in the "Journal of the Ministry of Agriculture and Fisheries," London, August, 1920 (abridged), of a paper read by Dr. E. J. Russell, F.R.S., Director of Rothamsted Experimental Station, at a meeting of the Farmers' Club, 31st May, 1920.

it is the chief source of the immediately beneficial part of the dung. The amount and value of the urine depend on the food and on the animal; urine contains the fertilising constituents of all the digested food which has neither been retained in the animal nor secreted in the milk.

Its composition can be calculated, and this is done in determining the manurial value of foods, but the calculation never comes out quite right, because its valuable constituents are so easily decomposable that they are readily lost.

Although the dry matter of the urine forms only about 2 per cent. of the actual weight of the dung, it constitutes a much larger proportion of the weight of fertilising materials. A ton of dung contains about 12 to 15 lb. of nitrogen, of which about 4 to 9 lb., according to the amount of cake and corn fed, would come from the urine.

2. *The Litter.*—Straw is by far the commonest litter, and it forms the chief part, by weight, of farmyard manure. Broadly speaking, 1 ton of straw makes 4 tons of farmyard manure, but the additional 3 tons is very largely water, only a small part being other excretory substances. Of 100 parts of farmyard manure made in a bullock yard, 75 are water, about 2 are solid constituents of the liquid excretions, about 8 are constituents of the solid excretions, and about 15 are constituents of the litter. On the basis of bulk, therefore, litter is more important than anything else, although not in other respects. Its chief effect is that it forms the humus in the soil, and therefore helps to promote tilth and to improve the water-holding capacity. Unfortunately, its change into humus is expensive to the farmer in that the organisms effecting the change take up valuable nitrogen compounds from the urine that ought to have gone to feed the crop.

THE MAKING OF FARMYARD MANURE.

The simplest case is that of manure made from fattening bullocks in stalls or covered yards where the manure is of considerable value, and where pains are commonly taken to preserve it. Of every 100 lb. of nitrogen fed to the animals, about 95 lb. pass into the manure—often about 45 to 60 lb. in the liquid and 50 lb. to 35 lb. in the solid excretions. The 45-60 lb. are in a form highly valuable to the plant. The decomposition process, however, takes rather a heavy toll, in one way or another about 15 lb., leaving 30 to 45 lb. in a form really useful to the plant. The nitrogen in the solid, and such of this 15 lb. as is not altogether lost, may at some time become useful to the plant, but it does not count for much; only the 35 to 40 lb. balance can be relied upon to yield any profit.

When, as often happens, the manure is made in open yards, the loss becomes more serious. The minimum loss of 15 per cent. is exceeded, often much exceeded, and, as always, it falls on the most valuable part of the nitrogen. It is probably not far wrong to suppose that the manure from a bullock receiving 3 lb. of cake and upwards per day is worth 15s. or more per month when made in a covered yard, but not more than some 10s. or 12s. per month when made in an open yard. For a herd of twenty bullocks, the loss in manurial value through having no roof to the yard may be any amount up to £5 per month.

It is often maintained, however, that some rain is necessary, as otherwise the manure becomes too dry. While a certain amount of moistness is necessary, rain may seriously damage the manure by washing out some of its valuable constituents and by bringing about certain undesirable changes. It is probably better to keep rain away from the manure and to ensure sufficient moisture by reducing the area over which the animals can wander, thus obtaining a high proportion of excretions among the litter. The comfort and well-being of the animals, however, must always be the first consideration. Practically pumping liquid manure or water over the heap is not to be recommended.

STORAGE OF FARMYARD MANURE.

In the matter of storage, the Northern farmer has some advantages over his colleagues in the South, one of which is that he can, as a rule, advantageously apply farmyard manure to his land in the spring. Manure made in the yards during winter can thus be hauled straight on to the land and ploughed in with reasonable certainty that this is the best thing to do. The Southern farmer, on the other hand, while he may be driven to spring applications of farmyard manure, would often obtain better results by applying the manure in the autumn. The storage of farmyard manure over the summer months thus becomes an important question.

However carefully matters are arranged, directly the manure is drawn from the yards some of its really useful nitrogen—the 30-lb. balance—begins to leak away.

It forms part of the odour that gave the old farmers so much satisfaction.* It enters largely into the black liquid, which, even in a well-conducted farm, is often seen draining away from the manure heap. Both smell and liquid are signs of leakage; but they do not represent the whole of the loss. It is wrong to suppose that matters can be put right by simply replacing the black liquid; its very existence is a symptom that bigger losses are taking place.

Many attempts have been made to obtain a reliable estimate of the amount thus lost. In experiments at Rothamsted the losses varied from 7 per cent. to 35 per cent. of the total nitrogen. A common loss was about 20 per cent., falling chiefly on the urine nitrogen. Assuming this latter figure were generally true—and we have no reason for supposing otherwise—our 30 lb. of valuable nitrogen would soon be reduced to little more than 10 lb.—*i.e.*, 35 per cent. of the original nitrogen, or 75 per cent. of the most valuable portion, has disappeared.

LOSS IN FARMYARD MANURE.

It has often been suggested that kainit, gypsum, superphosphate, or other substance added to the manure helps to reduce the loss by fixing ammonia. The processes bringing about the loss, however, are too complex to offer any reasonable expectation of the discovery of a satisfactory fixer.

It is difficult to form any estimate of the loss which occurs to farmyard manure over the whole country, but it must be considerable. Taking the present consumption of straw in the farm buildings of the United Kingdom to be about 10,000,000 tons per annum, the production of farmyard manure would be 40,000,000 tons, worth at present prices some £25,000,000 or more. The loss in making and storing the manure heaps is not less, but probably more, than 20 per cent. of this, *i.e.*, more than £5,000,000 each year.

This loss cannot altogether be avoided, because it is part of the cost of the necessary decomposition of the straw, but it can be much reduced. In experiments at Rothamsted the provision of shelter to keep off some of the rain much increased the effectiveness of the heap.

Shelter can be provided in several ways. A layer of earth has proved effective, but it is not always convenient. Straw-thatched hurdles acted well in the trials. Placing the heap in a well-sheltered position is also helpful.

At present prices it is probably safe to suppose that an amount from 1s. to 5s. is added to the value of every ton of manure by providing shelter.

THE FEEDING OF CAKE.

There has been considerable discussion as to the extent to which cake-feeding adds to the value of farmyard manure. In recent experiments the additional value due to the cake was less than was expected, and the benefit of the cake was shown only in the first year, and not afterwards. The practical man, however, holds fast to cake-fed dung, and recent experiments at Rothamsted have shown a direction in which it may be superior to ordinary dung. The breaking up of the litter to form humus is brought about by organisms which require the sort of nitrogen compounds that they would find in cake-fed dung; they would, therefore, be able to work more vigorously in cake-fed dung than in ordinary dung, and hence would tend to produce better soil conditions.

The evidence indicates that cake feeding produces less benefit than might be expected on soils where plant food only is needed, but more benefit on soils where additional humus is necessary.

COW MANURE.

The question of cow manure is complicated by the necessity for satisfying sanitary inspectors, and by the fact that it is of poorer quality than bullock manure.

The poverty of cow manure arises from the fact that a cow secretes a considerable proportion of the nitrogen of the digested food in the milk instead of passing all of it into the urine like a bullock. The urine is, therefore, weaker than in the case of bullocks, and there is a corresponding reduction in the value of the manure.

* At a meeting of the old East Moreton Farmers' Association, held at Oxley Creek many years ago, a lengthy discussion took place on the subject of Artificial and Farmyard Manures. The members who hailed from the farming districts of the old country held the opinion that farmyard manure was to be preferred to artificial, and one of them stated that when he had a manure with a "jolly good stink in it he knew it was all right."—Editor "Q.A.J."

On some of the Oxfordshire farms a big covered shed is built next the cattle-shed for the storage of manure. The principle is sound, but the plan is sometimes inconvenient in execution. In Cheshire one sees good dungsteads—roofs of corrugated iron carried on stout posts, and so placed that the dung can easily be tipped underneath and then compacted. These are of great value, but care must be taken that the manure is sufficiently well compacted to prevent it becoming too dry.

Cow manure, however, presents an interesting possibility, because so much of the liquid is or can be collected separately, and this should certainly be done wherever practicable. The liquid is very valuable, containing as a rule about 18 lb. to 23 lb. of nitrogen per 1,000 gallons, besides possessing a high potash value.

A suitable dressing is 1,500 gallons per acre, and it serves excellently for seeds and as a spring application for winter oats or winter wheat. On an average each cow contributes about $1\frac{1}{4}$ gallons of urine per day, *which is worth about 2s. 6d. per month. The difficulty at present is to apply this material.

ARTIFICIAL FARMYARD MANURE.

As the bulk of farmyard manure is litter, and the valuable part of the residue is largely made up of liquid excretions, it is not difficult for the scientific investigator to make an artificial farmyard manure from straw and artificial fertilisers. This has been done at Rothamsted, and 1 or 2 tons of the product were tried on the field. It is too early yet to say whether the material will work out economically in practice, but the principle is sound; it consists in allowing the straw to decompose with formation of humus, and supplying the necessary nitrogen compound in the form of an ammonium salt. When the details are worked out the method may probably prove of interest in districts like the Rothings, in Essex, where quantities of straw are produced but no live stock is kept, and yet where farmyard manure ought to be used.

POSSIBILITIES OF IMPROVEMENT.

The possibilities of improving bullock manure lie in the following directions:—

1. To make it in a covered yard, having sufficient beasts to keep the manure moist.
2. To put it into the ground as soon as possible after the beasts are removed; but, if this is impossible, to make a tight clamp and provide some shelter by a layer of earth or by some other device.
3. To avoid washing by rain or exposure to weather.

The defects of the clamp, even when compacted and sheltered, are recognised, and science has not yet said the last word as to the storage of manure; but for the present it is the only practicable method.

The improvement of manure from cowsheds can be effected:—

1. By collecting the liquid separately in a cement tank.
2. By storing the solid in a covered dungstead, to which can also be added manure from the horses. It is necessary to compact the heap. Provision must also be made for a tank to collect drainage.

The application of the liquid to the land, however, is a difficult problem. The method of distributing the liquid over the farm by means of pipes has been tried, but has resulted in financial loss. Something can be done by delivery from carts, but the most helpful line is the use of absorbents, which is now being investigated at Rothamsted. This is an important problem, and it will grow in importance if the soiling system of keeping dairy cows develops in this country.

THE CANADIAN PROVINCE OF ALBERTA.

Seldom do we hear any news about the agricultural position of this fine district of Canada, which extends from the northern frontier of the United States of America as far as the 60th parallel of north latitude, and between the Rocky Mountains of British Columbia, Saskatchewan, and Assiniboia. A very interesting account of the agricultural industry in this well-watered, fertile tract was lately published in the

* Both at Woking and at Garforth, however, Collins gives 5 gallons containing 4 lb. of dry matter as the figure for the north.

“Annales de Gembloux,” a very informative journal, of Belgium. The article is entitled—

A Few Remarks about Agriculture in Alberta (Canada).

By CHARLES FORCKEL, A.I.Gx., Okotoks, Alberta.

“Alberta is a Canadian Province spreading from the frontier of the United States of America as far as the 60th parallel, and between the Rocky Mountains and Saskatchewan. It has a population of 500,000 to 600,000. Its climate, depending on the latitude, varies with the regions. In general, winter is hard (60 F.). The favourable season (March-June to August-October) is short and frosty. Consequently, early species are utilised for cultivation.

“Among the cultivated varieties are the following:—*Wheat*: le Marquis (largely spread), Red Fife, Prélude, Kitchener, Rubis; *Oats*: Banner, Abundance, Garton No. 22, Seger or Victory, Leader (great yield); *Barley*: Gartons No. 68, Mandchouri, Mensury, Malster, O.H.C. 21.

“The climate requires farm work to be carried on quickly, which necessitates a large working-stock and the use of machines and tractors driven by a staff few in number.

“Four main regions characterise the country:

• “I. *Southern Alberta*.—Light, sandy, chocolate-brown soil, mostly suitable for wheat, which is the principal culture. The ground does not hold the water, and the drought causes heavy losses. Certain companies (Canadian Pacific Railway) are irrigating or will irrigate with profit. The cultivation of wheat is done by tractors. Very little attention is given to cattle and horse-breeding and dairy-farming.

“II. *Central Alberta*.—Heavier soil, blacker and richer, giving extraordinary crops during rather wet years. Owing to the early frost, wheat is cultivated on a smaller scale, and the crops are more varied: Oats, barley, pasture-land. For the latter, natural grazing land, *Bromus inermis* (excellent), Timothy, and also winter barleys are utilised. Draught and plough horses breeding (Clyde, Percheron, Shire, Suffolk Punch, and Belgian horse). Production of butcher’s meat (Hereford more resistant than Shorthorn). In the environs of Calgary there are a few milk herds. The dual-purpose variety is utilised for milk and meat. Since the war, sheep have been introduced with much success. Pig-rearing has been given up on account of the present economic conditions.

Yields per acre are estimated as follows:

	Grain.	Straw.
Spring wheat	25 to 30 bushels ..	1 to 1.5 tons
Spring wheat on fallow (summer fallow) ..	30 to 45 bushels ..	1.5 to 2.5 tons
Autumn wheat on fallow ..	40 to 45 bushels ..	—
Spring or autumn oats ..	45 to 60 bushels ..	1 to 1.5 tons
Oats on summer fallow ..	75 to 125 bushels ..	2 to 2.5 tons
Spring barley (6 rows) ..	20 to 35 bushels ..	1
Barley on fallow	35 to 70 bushels ..	1.5 to 2 tons
Fodder (depending on wetness of the year)	— ..	—
Flax	12 bushels ..	—

“Fallowing is largely done in order to conserve the water for more abundant crops, and also to get rid of weeds. The latter, especially the *Thlaspi arvense* (French weed) and the *Avena fatua*, are dreaded. These spread on account of the exclusive cereal cultivation. The majority of farms have an area of a half-section. (A section is 320 acres.) The buildings are made of wood and sometimes leave a lot to be desired.

“III. *North Alberta*.—Clayish soil, often swampy in certain regions (Peace River). Summer period shortened and humid. Wheat is not cultivated. Oats do not always come to maturity. Early barley gives crops. Farms of quarter-section predominate; horse, pig, and sheep-rearing; dairy farms are more frequent than in other regions. The population is mixed and few Canadians and Americans are to be found. On the Peace River side, wheat has been successfully cultivated, but could not be exported on account of the lack of railways.

“IV. *Foothills*.—Hilly and wooded region (pines, poplars, willows) at the foot of the Rocky Mountains. Owing to frost, oats do not ripen and are utilised as fodder.

This region is an ideal rearing place for horned cattle. Grass is abundant. Light-horse breeding has disappeared from these regions since the development of the motor car. Draught and plough horse breeding (Percherons).

“The price of farms is increasing more and more. Good land, which was worth 15 to 18 dollars a few years ago, is now worth 35 to 50. The emigrants who want to settle on their own must have a rather important capital; they must be experienced in agriculture, armed with patience, and not be afraid of working. For the use of machines and tractors, they must also be skilled in mechanics and electricity.

“Culture is extensive; one man per 100 acres. A farm of 1,500 acres has only four or five men in normal times. No improvements (draining or levelling) are being done at present. According to the Government statistics, a farmer and his family must dispose of half-section (320 acres) to enjoy a decent living.

“The situation of farmers is made uneasy by the difficulty in obtaining loans at a reasonable rate. Banks giving normally a 3 per cent. interest, lend to farmers at 8 per cent. and 10 per cent., and on short time. Mortgage societies lend at 7 to 9 per cent. on long time. Many farms are mortgaged; the farmer gives an instalment when he enters and hypothecates the remainder.

“Another disadvantage is due to the cost of railway transport and to the great distance of markets. However, thanks to the fertility of the soil, to rearing, and to the energy of the farmers, cultivation is developing successfully. Agriculture in Alberta is at present in its childhood, but there are great possibilities for the future. Great improvements will be necessary in the farm, in the way of cultivating and in the utilisation and sale of products. Such modifications can only be performed by work and time.

COTTON PROSPECTS.

The cotton crop of 1919-20 was the smallest for the past three seasons, due mainly to the persistent drought, which so seriously affected the germination of the seed that the area from which the crop was gathered amounted to barely 100 acres. In 1917 the area planted was 133 acres, which was increased in 1918 to 203 acres. The yield of clean lint from the 100 acres amounted to approximately 12,000 lb., for the purchase of which tenders were called in September last by the Department of Agriculture and Stock.

Now, how does this work out in the light of a payable crop as compared with other farm crops?

The preparation of the land for annual farm crops by ploughing and harrowing is much the same in the case of maize, potatoes, sugarcane, wheat, and other cereals as for a cotton crop, and in most cases the crops have to be kept free from weeds during their growth. There remain then the harvesting expenses. Maize, on attaining maturity, has to be pulled, husked, threshed and winnowed, and bagged. A potato crop must be dug or ploughed out, or possibly machine dug, after which some 4 to 8 tons per acre have to be picked up by hand, sorted, and bagged; sugarcane calls for trashing, cutting, topping, and milling; wheat, again, is cut, bound, stooked, stacked, threshed and winnowed; arrowroot is dug, washed, pulped, dried, and bagged; coffee entails pruning, strading, picking, pulping, milling to remove parchment and silver-skin, roasting, grinding, &c. Other crops are more or less costly to prepare for market. Cotton demands less expense in this direction. Putting aside the preparation of the land, sowing the seed, and subsequent scuffling of weeds, common to all farm crops, this crop entails only one operation as far as the farmer is concerned. That operation is picking. This is all that has to be done (except carting or railway freight) to place the cotton on the market in the shape of “seed cotton.” With the subsequent “ginning,” for separating the lint from the seed, the grower is not concerned. The seed cotton as picked from the bush is in marketable form.

An average crop of seed cotton we will set down at 1,000 lb. per acre, and good pickers can take off from 100 to 200 lb. per day. Even young people can gather from 60 to 100 lb. per day. The average of 1,000 lb. per acre has frequently been exceeded; in many cases, during the early days of cotton-growing in Queensland, crops of seed cotton were picked for a yield of from 1,500 to 2,000 lb.

If oil mills were established anywhere in the cotton districts or in the neighbourhood of Brisbane, the seed from the gin houses would have a high market value, which would materially increase the value of the cotton crop, as, in addition to the price of the lint, there would be an extra profit of about £8 per ton on seed purchased for the oil mill.

To sum up: Which of the crops enumerated is the most payable, especially in a dry season? Results have shown that the cotton-grower, even with a minimum crop of 1,000 lb. per acre, can obtain 4d. per lb., which is equal to £25 per acre, less few expenses. And there is yet a further value of this crop, in that the cotton bush is an excellent fodder for stock, for which purpose it can be utilised when the last picking has been done.

In some respects the raising of cotton plants is easier than is the case with other field crops in a dry season, provided that rain occurs after sowing time, for once the young plants have sprung up and have made good growth up to 1 ft. or so, they are practically drought-proof. Furthermore, if the plants have been kept clean of weeds during their early growth, they will need little further attention from that period to maturity.

Last season's sowing, being carried on as late as January, 1920, resulted in much of the areas furnishing but a half or quarter crop. Many farmers planted late, having in view an early 1921 harvest. This practice has much to commend it, as in the event of a dry spring preventing early planting, the growers having ratoon shrubs will thereby be sure of a crop of early-maturing cotton. As every month's growth increases the annual yield, it follows that a germination in September or October will result in a much heavier crop than will cotton grown in subsequent months. It must be held in mind that sowing as late as January is not advised in the colder regions, but in the Central and North this method is justified.

COTTON SITUATION—FACTORS THAT COUNT.

MORE PRODUCTION NEEDED.

It is reported from London that the movement for increasing the supply of cotton has made further progress, and the Empire Cotton-Growing Committee has published its organisation scheme for countries in which the work has not yet been largely developed. The educational part is expected to cost £27,000, and the whole scheme £200,000 a year, the greater part of which, it is anticipated, will be supplied by the trade.

Sir Charles W. Macara, of Manchester, the great authority on cotton, in referring to the fluctuations which have taken place recently in the prices of raw material, writes to "The Financial Times" that while he firmly believes in the absolute indispensability of the legitimate middlemen who handle the cotton crop of the world, he is entirely against those who make the raw material of an international industry a counter for gambling operations. It is that, he says, that is mainly responsible for the want of confidence and the existing lack of stability.

The fall on the American Cotton Exchanges is followed immediately by an almost unprecedented rise and another fall. The figures that appear in the Press of these fluctuations are misleading to those who are not conversant with the methods of the trade. The prices of the finer qualities of cotton, required by England more than by any other country, have been going up when the official prices recorded in the Press have been going down, and it is not unusual for futures to be declining while actual cotton has been rapidly going up.

THE DOMINANT FACTORS.

Sir Charles states that the dominant factors in the present situation are as follow:—

- (1) From various causes there is still a large amount of the cotton machinery of the world idle.
- (2) Production has been considerably curtailed by the reduction of the working hours in England from 55½ to 48 hours a week, and this process has been going on throughout the world during the past twelve years or more.
- (3) The machinery available, it is obvious, dominates the situation as regards the supply of the manufactured goods, and a fall in the raw material would not alter the present situation, especially as raw material bought now would require six, nine, twelve months, or even longer, before it could pass through the numerous processes necessary.

- (4) It is possible, as recent experience has proved, for any fall in the cost of the raw material to be counteracted by increases in wages and by the ever-growing cost of everything that enters into the manufacture of cotton goods.
- (5) An enormous reduction has taken place during the war period in the output of cotton fabrics, which play a preponderating part in clothing the people of the world.
- (6) The textile machinists, who were very largely employed on munitions, have an almost impossible task in making up the leeway of the war period, both in regard to renewals and in regard to the normal extension of textile machinery which obtained in the year before the war.

WORLD'S CONSUMPTION.

The world is now consuming, according to a statistical publication just issued by the National City Bank of New York, 21,000,000 bales of cotton a year, of which the United States produces, on a five-year average, 11,500,000 bales, or just half the total consumption. This year's American crop is likely to be 12,000,000 bales; but that any market increase above 12,000,000 is possible in the future is considered improbable by American cotton experts, who declare that the limit of America's cotton-producing capacity has been nearly reached. Considerable areas still exist which might be devoted to cotton, but the growing tendency of southern planters to diversify crops will encroach on cotton lands.

The growth of the world demand, which, statisticians estimate, will amount to 30,000,000 bales inside of ten years, will require, therefore, greatly increased cotton production in other countries than America, and probably in countries not now great producers, as Egypt and India are also believed to have approached their maximum. For this reason Mesopotamia is being watched with the greatest interest by cotton people, who foresee a great future for that country under British direction. Australia is also regarded by American cotton manufacturers as a probable future source of raw cotton.

The National City Bank's statistical tables show that of the 6,483 cotton mills of the world 2,009 are in Great Britain and 1,451 in the United States, the two countries having more than half of all the mills in the world, and consuming 10,000,000 bales of cotton a year, or about half of all the cotton the world produces. Adding Indian and Canadian mills to Great Britain's total brings it to 2,322 mills, with a consumption of 6,109,141 bales, somewhat above the total consumption of the American mills (6,065,686 bales). The only other countries engaged largely in cotton manufacturing are France, with 430 mills and a pre-war consumption of a little over 1,000,000 bales; Italy, with 480 mills and a normal consumption of 850,000 bales; Japan, and China.

Japanese mills, according to the latest available census, numbered 175, and their consumption in 1915 was 1,500,000 bales; China's 34 mills in 1913 consumed 525,000 bales of cotton. Both these countries are materially increasing their cotton-manufacturing capacities, and China is increasing her local growth of cotton. It will be some years, in all probability, before Germany and Russia again become serious factors in the cotton goods trade.

The inference from the figures and collateral evidence, says the National City Bank, is that the future of the manufacturing cotton industry of the world is in the hands of the Anglo-Saxon peoples, and that the bulk of the world's cotton will be grown in lands under the Union Jack and the Star and Stripes.—“Daily Mail” (Q.).

[From the above, it will be clear that the cultivation of cotton within the Empire must largely expand. Queensland, amongst other portions of the British Empire, is eminently adapted to successful and profitable cotton-production, and from all accounts received from Britain, the United States, Egypt, and India, there appears to be a vast shortage in the supply for the raw material at remunerative prices. We have consistently urged the farmers to plant small areas of cotton, which could be managed by the grower and his family, and, indeed, profitably by hired labour. The opportunity of raising the State to the position of a great cotton-producing country is at our hand, assisted as we are by the action of the Government in establishing a cotton-ginning plant, and guaranteeing a price of 5½d. per lb. for cotton in the seed delivered to the Department of Agriculture to be ginned and marketed, together with a division of profits amongst suppliers after deduction of ginning and market expenses.—Ed. “Q.A.J.”]

Pastoral.

BLOWFLY MAGGOTS: IMPORTANT DISCOVERY.

Dr. A. Altson, who is engaged in research work at the Imperial College of Science, under the direction of Dr. Lefroy, professor of entomology, has obtained results which will prove effective in the suppression of the sheep maggot fly. Dr. Altson's success was due to the accidental discovery that blowflies, breeding in the Zoological Gardens, suffered heavily from attacks of three natural enemies, of which two are already known in Australia. The third and the chief is the *Alysia manductor*. This fly ovideposits in blowfly maggots which, as a result, do not produce blowflies, but *Alysia*.—"Times," London.

Mr. W. G. Brown, Sheep and Wool Expert of the Department of Agriculture and Stock, was engaged last month in experiments which were carried on by the special Blowfly Committee of the Federal Institute of Science and Industry for some past at Dalmally, in the Roma district, and the operations have resulted in considerable success. An inspection of 16,000 sheep experimented on showed that the treatment of these animals against the blowfly pest had been signally successful.

Five experiments, varying in the degree of the strength of the poison used, were carried out. The most satisfactory experiment was that in which the most poisonous mixture was used. It consisted of one packet of poisonous dip and 4 lb. of arsenic dissolved with soda in 120 gallons of water. This mixture was jetted into the breach of the sheep with a power pump at a pressure of 120 lb., and had given the sheep immunity for nearly three months, carrying them over the worst period—that of lambing. A report on the experiments will be submitted to the Blowfly Committee at a subsequent meeting.

Mr. Brown stated that the country in the Roma district was looking beautiful, and that the season was the best since 1903. The stock was in very good condition, excepting for the blowfly pest, which was very bad.

PLANTATION FUTURES.

A friend in the Far East advises the editor of "India Rubber World" that within five years the rubber plantations in India, Ceylon, and the Malay States will be run by Soviets. This change of ownership will come about through a union of the Russians under Lenin, and the Hindoos and Mohammedans of India, who will throw off the "British Yoke." This would mean \$10 rubber and a greatly lessened production. It would also be "Red Rubber" in the worst sense of the term.

If memory does not play us false the same source predicted the destruction of Malaysian plantations by disease before 1918. The disease came, but the planters promptly stamped it out. So, too, will the red disease be stamped out in the Far Eastern possessions.

Nevertheless, not that we believe there is any such danger in sight, America as the biggest user of crude rubber should look far ahead for its supplies. The Philippines for planting are ideal once the Filipino will allow it to be done as the rest of the world does it. Then, too, there are our own rubber producers, guayule and *Chrysothamnus*. Of the latter, Luther Burbank, the great plant wizard, in a letter to one of our staff, says that there is not a shadow of a doubt that by analysis of the different individual plants from different localities the rubber content of some will be found to be double that of others, and by starting with these high rubber content plants, and growing from these, any good plant breeder could originate a plant in a reasonably short period that would produce twice as much as the average wild ones do. He says this is a very moderate estimate, as it would not be surprising that a plant should be constructed which would produce ten times the results of the wild ones. Of course, vigour is one of the things to be considered, and possibly compactness of growth, and other matters which would come up during the work of improvement.

A 7 per cent. content has already been found. Double this would be 14 per cent., and ten times as much would be a bonanza. Anyhow, 14 or 70, it's worth working for. —"Planters' Chronicle."

Dairying.

FEEDING PIGS ON DRIED BLOOD.

Referring to the article on "Some Feeding Experiments with Dried Blood," by L. F. Newman, School of Agriculture, Cambridge, published in the September (1920) issue of the Q.A. Journal, a correspondent writes from Beerwah as follows:—

"A neighbour had two pigs which were not thriving, so I bought the worst of them for experimental feeding. To begin with, I gave it two handfuls per day of dried blood mixed with its food, with the object of imparting energy. A few days later I added the same quantity of linseed meal to loosen the skin, and take the stiffness out of it. The pig experimented on was over twelve months old, and, of course, the bone was there. I am now sorry that I did not weigh the animal before making the experiment. It would probably have had a weight of about 56 lb. In five weeks of the feeding described, its weight was 114 lb. and was graded first-class at the factory."

TAKING WATER OUT OF FRUIT.

"Food is the primal need of the world to-day. Next to love, it is the most important thing in life," said Lieutenant R. G. Booth, who returned to Brisbane last October from California. During the past twelve months he has been an A.I.F. repatriation student of the newest American agricultural methods. He left Queensland in June, 1915, as a member of the 4th Light Horse Brigade, under command of Brigadier-General (then Colonel) Spencer Browne. In 1916 he sailed from Egypt for Europe and joined the Australian Flying Corps. In August last year he went to America with ninety-six other Australians to study agriculture. Captain Albert Laver, of Springsure, was one of the party. Lieutenant Booth is the guest of Mr. A. J. Thynne, M.L.C., while in Brisbane.

Chatting with a representative of "The Daily Mail," he said: "My reason for wanting to go to America was this: I noticed in the Strand one day some miserable-looking banana figs on sale. The salesman told me that he handled so many tons of them every week, and I conceived the idea of drying them so that they would retain their colour, shape, and natural flavours. I tried to get to Germany, where they have made great progress in dehydration, which means the removal of surplus water from foodstuffs without destruction of the cellular tissues or impairment of the energy values. In Germany they had 1,900 separate plants, but I was not permitted to go there. Instead, I obtained consent to visit America, which has a special dehydration department attached to its Department of Agriculture, and everything possible is done to foster the industry.

REMOVING WATER.

"The industry consists mainly of removing the moisture from fruits and vegetables by means of carefully regulated currents of air, in which the temperature and humidity are both properly controlled, being passed over the food either with or without previous treatment. This results in the food product gradually losing water without giving up its colour, flavour, or having its cellular structure impaired. A properly dehydrated product will keep, as far as is known, for an indefinite time, and will, when placed in water, swell to its normal size and appearance. When cooked it will have essentially the flavour, odour, and appearance of freshly cooked material made from the fresh product.

"At one of the leading San Francisco hotels a party of prominent people were told that some of the vegetables to be served at dinner would be dehydrated and others fresh. They were requested to write down at the time they ate them which they thought were fresh and which were dehydrated. The results proved that no difference could be detected."

Poultry.

REPORT ON EGG-LAYING COMPETITION, QUEENSLAND AGRICULTURAL COLLEGE, SEPTEMBER, 1920.

The laying for the month was very good. The weather conditions were excellent. There was abundance of green feed, the result being that all the birds are in good fettle. Mr. J. E. Smith was unfortunate enough to lose two birds during the month, the cause of death in both cases being ovarian disorder. Two single birds laid the possible for the month, one owned by L. G. Innes ("D") and the other by E. F. Dennis ("E"). Several laid 28 eggs in the 30 days, and quite a number 27. The highest score for six birds in the light section was 159 eggs, laid by Mr. Manson's pen. This was followed by Mr. N. A. Singer with 158, and Mr. L. G. Innes with 156 eggs. In the heavy section, the pen owned by Mr. Shanks laid 157, with Mr. Cornwall's second with 152 eggs.

The following are the individual scores and the weights of eggs laid by the various competing pens:—

Competitors.	Breed.	Sept.	Total.
LIGHT BREEDS.			
*G. Trapp	White Leghorns ...	147	754
*Haden Poultry Farm	Do.	148	750
*O. W. J. Whitman	Do.	140	746
Geo. Lawson	Do.	140	740
*J. J. Davies	Do.	140	715
*J. Newton	Do.	145	712
*J. M. Manson	Do.	159	710
*S. McPherson	Do.	125	702
*Quinn's Post Poultry Farm	Do.	144	701
*W. Becker	Do.	134	685
*Dr. E. C. Jennings	Do.	143	679
*W. and G. W. Hindes	Do.	136	672
*T. Fanning	Do.	132	669
*J. H. Jones	Do.	135	668
*H. Fraser	Do.	136	663
*G. Williams	Do.	137	662
*E. A. Smith	Do.	141	651
*L. G. Turner	Do.	156	650
*N. A. Singer	Do.	158	647
S. L. Grenier	Do.	131	640
Thos. Eyre	Do.	137	638
*Mrs. L. F. Anderson	Do.	140	634

EGG-LAYING COMPETITION—*continued.*

Competitors.	Breed.	Sept.	Total.
LIGHT BREEDS— <i>continued.</i>			
Mrs. R. Hodge	White Leghorns	149	631
*S. W. Rooney	Do.	136	625
*Range Poultry Farm	Do.	126	617
*B. Chester	Do.	138	613
*Mrs. L. Henderson	Do.	136	600
W. Morrissey	Do.	124	599
*Thos. Taylor	Do.	137	592
Miss E. M. Ellis	Do.	125	583
Avondale Poultry Farm	Do.	130	578
E. Chester	Do.	127	574
A. J. Anderson	Do.	110	566
H. P. Clarke	Do.	130	565
C. Langbecker	Do.	117	554
R. C. J. Turner	Do.	124	553
C. M. Pickering	Do.	112	543
C. H. Towers	Do.	108	525
S. Chapman	Do.	125	516
W. D. Evans	Do.	128	485
H. A. Mason	Do.	134	482
C. A. Goos	Do.	123	489

HEAVY BREEDS.

*R. Holmes	Black Orpingtons	135	777
*D. Fulton	Do.	121	756
*E. F. Dennis	Do.	151	745
*R. Burns	Do.	149	742
*A. Shanks	Do.	157	720
*E. Morris	Do.	145	717
*A. Gaydon	Do.	143	707
H. M. Chaille	Do.	134	707
*A. E. Walters	Do.	128	695
*W. Smith	Do.	138	687
*E. Oakes	Do.	127	651
J. E. Smith	Do.	121	641
*T. Hindley	Do.	117	633
*R. B. Sparrow	Do.	137	612
J. Cornwell	Do.	152	609
G. Muir	Do.	142	606
Parisian Poultry Farm	Do.	128	601
R. C. Cole	Do.	139	588
Mrs. G. H. Kettle	Do.	131	587
*Nobby Poultry Farm	Do.	114	559
*J. E. Ferguson	Chinese Langshans	119	555
*E. Stephenson	Black Orpingtons	119	536
G. Flugge	Do.	120	410
Total ... ..	...	8,710	41,169

* Indicates that the pen is being single tested.

RESULTS OF SINGLE HEN PENS.

Competitors.	A.	B.	C.	D.	E.	F.	Total.
--------------	----	----	----	----	----	----	--------

LIGHT BREEDS.

G. Trapp	136	119	130	126	130	113	754
Haden Poultry Farm	146	102	141	131	113	117	750
O. W. J. Whitman	116	116	132	120	127	135	746
J. J. Davies	124	118	117	142	113	101	715
J. Newton	141	111	122	85	122	131	712
J. M. Manson	124	120	132	115	100	119	710
S. McPherson	131	120	91	116	134	110	702
Quinn's Post Poultry Farm	131	125	126	116	97	106	701
W. Becker	120	120	126	110	90	119	685
Dr. E. C. Jennings	112	127	100	105	104	131	679
W. and G. W. Hindes	122	113	96	119	101	121	672
T. Fanning	49	122	114	127	128	129	669
J. H. Jones	109	113	118	120	124	84	668
H. Fraser	102	102	120	117	119	103	663
G. Williams	109	112	112	109	125	95	662
E. A. Smith	107	99	121	108	112	104	651
L. G. Innes	65	101	133	112	133	106	650
N. A. Singer	111	98	113	127	102	96	647
Mrs. L. F. Anderson	129	115	122	93	87	88	634
S. W. Rooney	83	83	127	107	107	118	625
Range Poultry Farm	78	107	108	123	95	106	617
B. Chester	106	79	105	113	108	102	613
Mrs. L. Henderson	85	97	107	99	115	97	600
Thos. Taylor	124	107	71	104	90	96	592

HEAVY BREEDS.

R. Holmes	126	136	125	125	130	135	777
D. Fulton	132	139	118	118	88	161	756
E. F. Dennis	126	106	134	125	116	138	745
R. Burns	119	99	139	114	149	122	742
A. Shanks	102	114	119	139	92	154	720
E. Morris	123	122	129	99	111	133	717
A. Gaydon	114	147	112	97	93	144	707
A. E. Walters	107	119	98	135	103	133	695
W. Smith	87	139	124	130	101	106	687
E. Oakes	103	124	128	59	122	115	651
T. Hindley	106	130	107	130	63	97	633
R. B. Sparrow	114	54	125	110	88	121	612
J. Cornwell	99	136	102	74	87	111	609
Nobby Poultry Farm	105	146	73	147	68	20	552
J. E. Ferguson	53	103	73	95	134	97	555
E. Stephenson	120	86	81	113	72	64	536

CUTHBERT POTTS,
Principal.

WEIGHT OF EGGS, SINGLE HEN PENS.

	A.	B.	C.	D.	E.	F.	Average.
	Oz.	Oz.	Oz.	Oz.	Oz.	Oz.	Oz.

LIGHT BREEDS.

Mrs. Anderson	1 ⁷ / ₈	2	1 ⁷ / ₈	2 ¹ / ₈	2 ¹ / ₈	2	2
H. Fraser	1 ¹ / ₄	2	2	2	2	2 ¹ / ₈	2 ¹ / ₈
B. Chester	2 ¹ / ₈	2 ¹ / ₄	2 ¹ / ₈	2	2	2 ¹ / ₈	2 ¹ / ₈
Quinn's Post	1 ⁷ / ₈	2	1 ⁷ / ₈	2	2 ¹ / ₈	1 ⁷ / ₈	2
T. Fanning	2 ¹ / ₄	2 ¹ / ₈	2 ¹ / ₄	2 ¹ / ₈	1 ⁷ / ₈	1 ⁷ / ₈	2 ¹ / ₈
E. A. Smith	1 ⁷ / ₈	2 ¹ / ₈	1 ⁷ / ₈	1 ⁷ / ₈	2 ¹ / ₈	2	2
T. Taylor	2	2 ¹ / ₈	1 ⁷ / ₈	2	2	2	2
Range Poultry Farm	2 ¹ / ₄	2 ¹ / ₈	2 ¹ / ₈	2	1 ⁷ / ₈	2 ¹ / ₈	2 ¹ / ₈

WEIGHT OF EGGS, SINGLE HEN PENS—continued.

—	A.	B.	C.	D.	E.	F.	Average.
	Oz.	Oz.	Oz.	Oz.	Oz.	Oz.	Oz.
LIGHT BREEDS—continued.							
S. W. Rooney	2 ¹ / ₈	2 ¹ / ₈	1 ⁷ / ₈	2	2	2	2
O. W. Whitman	2	1 ⁷ / ₈	1 ⁷ / ₈	2	1 ⁷ / ₈	1 ⁷ / ₈	1 ⁷ / ₈
S. McPherson	2	1 ⁵ / ₈	2	1 ⁷ / ₈	2	2 ¹ / ₈	2
J. H. Jones	2 ³ / ₈	2 ¹ / ₈	2	2 ¹ / ₄	2 ¹ / ₄	2 ¹ / ₄	2 ¹ / ₄
Geo. Trapp	2	2	1 ³ / ₄	2	1 ⁷ / ₈	2 ¹ / ₈	2
L. G. Innes	1 ³ / ₄	2	1 ³ / ₄	1 ⁷ / ₈	2	2	1 ⁷ / ₈
W. Becker	1 ⁷ / ₈	2 ¹ / ₈	2	2 ¹ / ₄	2 ¹ / ₄	2 ¹ / ₈	2 ¹ / ₈
G. Williams	2	2	2	2	1 ⁷ / ₈	2 ³ / ₈	2
J. J. Davies	1 ³ / ₄	2 ¹ / ₈	2	1 ⁵ / ₈	1 ⁷ / ₈	2	1 ⁷ / ₈
Dr. Jennings	1 ⁷ / ₈	2	2 ¹ / ₈	2 ¹ / ₈	1 ⁷ / ₈	2	2
N. A. Singer	2	2	2	2	2	2	2
Haden Poultry Farm	1 ³ / ₄	2 ¹ / ₈	1 ⁷ / ₈	2	2 ¹ / ₈	2	2
J. D. Newton	2	2	2	2 ³ / ₈	2	2	2
W. and G. W. Hindes	2 ¹ / ₈	2 ¹ / ₈	2 ¹ / ₈	2 ¹ / ₄	2	2	2 ¹ / ₈
J. M. Manson	2	1 ⁷ / ₈	1 ⁷ / ₈	1 ³ / ₄	1 ⁷ / ₈	2	1 ⁷ / ₈
Mrs. Henderson	2 ¹ / ₈	2 ¹ / ₈	2	2 ¹ / ₈	2 ¹ / ₈	2 ¹ / ₈	2 ¹ / ₈

HEAVY BREEDS.

T. Hindley	2	2	1 ⁷ / ₈	1 ⁷ / ₈	2 ¹ / ₈	2	2
J. A. Cornwell	2 ¹ / ₈	2	1 ⁷ / ₈	2	2	1 ⁷ / ₈	2
E. Morris	1 ⁷ / ₈	2	2 ¹ / ₈	2	2 ¹ / ₈	1 ⁷ / ₈	2
A. E. Walters	2 ¹ / ₈	2 ¹ / ₈	2 ¹ / ₂	1 ⁷ / ₈	1 ⁷ / ₈	1 ⁷ / ₈	2 ¹ / ₈
R. B. Sparrow	2 ¹ / ₈	2	2	2 ¹ / ₈	2 ¹ / ₈	2	2 ¹ / ₈
Nobby Poultry Farm	2 ¹ / ₈	2	2	1 ⁷ / ₈	2	*	2
A. Shanks	2	1 ⁷ / ₈	2	1 ⁷ / ₈	2	2 ¹ / ₄	2
R. Burns	2 ¹ / ₄	2 ¹ / ₄	2 ¹ / ₈	2 ¹ / ₈	1 ⁷ / ₈	2 ¹ / ₈	2 ¹ / ₈
E. Oakes	1 ⁷ / ₈	1 ³ / ₄	1 ⁷ / ₈	2 ¹ / ₈	2	2	2
W. Smith	1 ³ / ₄	2	1 ⁷ / ₈	1 ³ / ₄	1 ⁷ / ₈	1 ³ / ₄	1 ⁷ / ₈
E. Stephenson	1 ⁷ / ₈	1 ⁷ / ₈	2 ¹ / ₄	2 ¹ / ₈	2	2 ¹ / ₈	2
E. F. Dennis	1 ⁷ / ₈	1 ⁷ / ₈	1 ⁷ / ₈	1 ³ / ₄	1 ⁷ / ₈	1 ³ / ₄	1 ⁷ / ₈
J. E. Ferguson	2 ¹ / ₈	2 ¹ / ₄	2 ¹ / ₄	2 ¹ / ₄	2 ¹ / ₈	1 ⁷ / ₈	2 ¹ / ₈
R. Holmes	2	2 ¹ / ₈	1 ⁷ / ₈	2 ¹ / ₈	2	2	2
D. Fulton	1 ⁷ / ₈	1 ⁷ / ₈	2	1 ⁷ / ₈	1 ⁷ / ₈	1 ³ / ₄	1 ⁷ / ₈
A. Gaydon	2 ¹ / ₈	1 ⁷ / ₈	2	2 ¹ / ₈	2	2	2

GROUP PENS.

—	Average.	—	Average.
LIGHT BREEDS.			
	Oz.		Oz.
Miss E. M. Ellis	1 ⁷ / ₈	S. Chapman	2
E. Chester	2	Avondale Poultry Farm	1 ⁷ / ₈
C. A. Goos	2	R. C. J. Turner	2
Geo. Lawson	1 ⁷ / ₈	W. D. Evans	2
Thos. Eyre	2	G. Langbecker	2
H. A. Mason	2	C. M. Pickering	2 ¹ / ₈
C. Towers	2	S. L. Grenier	2
W. Morrissey	2	A. J. Anderson	1 ⁷ / ₈
H. P. Clarke	2	Mrs. R. Hodge	2
HEAVY BREEDS.			
Parisian Poultry Farm	2	Mrs. G. H. Kettle	2
H. M. Chaille	2	G. Flugge	2 ¹ / ₈
G. Muir	1 ⁷ / ₈	J. E. Smith	1 ⁷ / ₈
R. C. Cole	2 ¹ / ₈		

* Eggs of Nobby Poultry Farm's F. bird were not weighed.

POULTRY CONFERENCE.

The Annual Conference of poultry enthusiasts was held at the Gatton Agricultural College on Wednesday, the 29th September. The visitors were taken round the competition pens during the morning by the College expert, Mr. A. G. Harwood. In the afternoon the conference was held in the gymnasium, the Principal (Mr. Cuthbert Petts) presiding.

On behalf of the Minister for Agriculture, Mr. Potts welcomed the visitors. He said he was sure the conference had done good in the past, and they would do more good in the future.

THE POULTRY TICK.

The Chairman remarked that the first item on the agenda paper was a discussion on the poultry tick, which subject Mr. Gould had promised to introduce. Unfortunately, Mr. Gould was not present. He (the Principal) understood that the ticks were migrating down, and had reached Toowoomba. He thought the conference might deal with the question, and he invited anyone who had experience of the pest to bring the subject before the meeting.

Mr. Cole (Toowoomba) said the tick was pretty prevalent in Toowoomba. The only remedy he knew of was to swing the perches and well spray the houses with kerosene emulsion. That had been done before in Bathurst (New South Wales), where he had had previous experience of the tick. In Toowoomba some fowls were sick, and they were said to have some other trouble, but it was really the tick. It was a very serious trouble.

Mr. Greasley (Ipswich) said he had had some experience with the tick in Ipswich. He did not know where they came from, and he did not know he had them until he could almost shovel them up. The only way he found to get rid of them was to loosen up everything, use plenty of hot tar, and swing the perches as the previous speaker had mentioned.

Mr. Morris said he had seen the red mite pest, and had seen one man get rid of them by using a blow-pipe, similar to that used by painters. Might not this remedy be also applied to the tick pest?

Mr. Cole: A lot of people think they have no ticks because they do not find them in the daytime, but they can be found at night if they are present in any fowlhouse. He thought they should do away with wood altogether, and have iron everywhere in their houses. Cracks and crevices only harboured the ticks. He understood that the ticks were cannibals, and would live on each other for a long time.

Mr. Anderson said he always made a practice, in getting birds by rail, to burn the crates as soon as he took the birds out. He understood that the tick would lie dormant for from five to seven years, even if in a bottle. He agreed that the tick was nocturnal in its habits, and it did not appear until the warmth produced by the birds caused them to do so. He thought tarring the place was the best. Some people suggested liming, but he found that it was possible for ticks to be harboured by the lime caking. He thought it would be a good thing if the Department issued a leaflet on the poultry tick. Articles were published in the South, and no doubt these could be improved upon and made suitable to this State.

Mr. Langegorff (Nobby) said the tick was often conveyed in the railway crates.

Mr. Murray said he had been told that the only way to get rid of the tick was to burn everything. He was judging poultry at Goondiwindi in 1918, and there were a few ticks about then. In 1919 there was no show, but when he was up there again this year, they were very thick. The poultry steward at this place told him that the ticks bred in every place, even in the crevices of doors. The show committee had decided to destroy the whole lot of their coops.

Mr. Harwood said he had been told at one of the poultry conferences at the College that the pepperina trees were a great harbour for the tick. He at once proceeded to make investigations into the matter, and he found that these trees were no worse than any other in that respect, but that the ticks would gather together in any protected place they could find. As a matter of fact, practically every farmer in the Lockyer district had pepperina trees growing in his yard, and they had not discovered that these trees were any worse than any other for harbouring ticks. They would congregate even in the overlaps of corrugated iron. He had heard that a collapsible metal crate had been invented. If these were brought into existence they would prevent a good deal of the transmission of the tick on the railways. He thought it was the work of the Government to undertake the solution of the trouble. Any person who had been proved to have poultry tick in his yard should immediately be interviewed, and he should not be allowed to dispose of his birds while his yard was in such a state.

The Chairman said one or two points had been brought forward during the discussion. There was the suggestion that a pamphlet be issued by the Department, the proposed destruction of crates from infested districts, and later, they had the suggestion from Mr. Morris that railway crates were responsible for the transmission of the tick. He thought definite resolutions might be submitted on these matters. They should not wait until the tick invaded their own yards before they attempted to secure some improvement.

Mr. Walters moved that the Agricultural Department be asked to allow Mr. Beard to prepare a pamphlet on the tick, and the best methods of combating its spread.

Mr. Harwood said he had noticed that an announcement that Mr. Beard had come across a tick trap. If that were so, the inventor should be given assistance in bringing his invention before the public.

Mr. Anderson seconded the motion. He thought the Department's pamphlet might deal not only with the cause of the pest, but with the best method of combating it, and should give some data as to the destruction it was causing. Probably such a pamphlet could be issued before the end of the year.

The motion was carried.

Mr. Campbell moved that the Department be asked to investigate the extent of the present area affected with the pest, and also to devise some means whereby the spread of the pest can be combated.

Mr. Holmes: Mr. Beard, speaking at Toowoomba recently, said there were ticks all over the State.

Mr. Campbell: If that is so, it is better for us to know it.

Mr. Murray: In South Brisbane I know a man who had ticks in his yard, and after trying to get rid of them for six or seven weeks without success, he gave it up, and decided not to keep birds.

Mr. Anderson stated that there was no need for the last motion, which was covered by the first. The pamphlet which had been proposed should, he thought, contain statistical information.

The Chairman: You also asked that the pamphlet be printed before the end of the year. In this motion we have a problem which will take much longer than that to solve.

Mr. Anderson: Then I will second the motion. I think it is desirable to get a full Departmental inquiry.

The Chairman said: If the Department did take up the investigation, he thought it should deal with the problem of railway transit, as well as the other questions raised, which were not mentioned in the first motion.

The motion was carried.

Mr. Cole: Will this debar anyone who is competing from what might be pronounced to be an infested area from again competing? He may not have the tick in his own yard. Will this debar him from competing?

The Chairman: I do not think that question can be answered until the Department has arrived at some definite conclusion on the matter. From now on, you may be sure we shall take strict precautions about the competition pens, as well as in regard to any crates which come here. It is possible that a regulation will be introduced to enforce the destruction of all crates.

One of the visitors suggested that the railway crates should not be taken away from the station, but that persons getting birds should take them out of the crates at the stations.

The Chairman: I do not think there will be any difficulty in framing railway regulations.

Mr. Holmes remarked that it would always be found that if a man tackles these problems he can overcome them. Cleanliness was one of the great features in combating disease of any kind.

MARKETING OF EGGS.

Mr. Campbell was then asked to read the report of the N.U.P.B.A. on the action taken in connection with the marketing of eggs.

The Chairman mentioned that at the last conference the Association had been requested to give consideration to the feasibility of forming a co-operative company for the distribution of eggs, or any other scheme for the control of the market.

Mr. Campbell stated that, though the Association had not been successful in forming the proposed co-operative company, it had been able to arrange that the eggs belonging to members of the Association do not fall below 1s. 4d. a dozen in price. If the eggs did not bring this price they were put into cold storage, and members received an advance of 1s. a dozen. When the eggs are sold from cold storage, the producer gets the balance, with any profit which may be made after the payment of commission and expenses for the storage. At the sale previous to this arrangement, eggs brought 1s. 1½d. to 1s. 3d. at one time, with the prospect of going still lower in price. Since the arrangement had been made, the eggs supplied by members of the Association had not brought less than 1s. 6d. a dozen, with the exception of one occasion. The Association had endeavoured to fix the price higher than 1s. 4d., but a large number of eggs were being sent here from Adelaide at the time, and this brought the market down, the consequence being that the Association had to accept less than they otherwise would have done. He urged all poultrymen to support the Association. They had a scheme of co-operative marketing in hand, but without the support of the producers the Association could not do anything. With their support, however, it would be possible to achieve anything in that connection.

The Chairman said that apparently the conference had done a lot of good in bringing up this matter at the last gathering.

Mr. Harwood: Might we congratulate the N.U.P.B.A. on what it has done? I noticed a reference in the "Poultry Bulletin" last week which was very favourable to the eggs sent down to Sydney by the Association. In fact, it appears that Sydney and Adelaide have got behind the Queensland members in this connection.

The Chairman: This scheme has been confined to members of the N.U.P.B.A. I take it this is because it is only for members that the Association can guarantee infertile eggs, which are necessary for cold storage. In that case, I think you all ought to join the Association, and get all you can. (Applause.)

Mr. Campbell: We confine the scheme to members because we have no control over any outsiders. The aim of the Association is to bring out of the cold storage an absolutely first-class article. It is the intention of the N.U.P.B.A. to brand all the eggs for cold storage. Cold store eggs, at the present time, are largely used for manufacturing purposes, cake making, &c., and there is not the slightest reason why the cold-store eggs should not be used in every kitchen in Queensland. It would not affect the use of the new-laid egg, because they are not used for the same purpose, but people would do better to buy cold-store eggs for cooking instead of grocer's eggs of very doubtful quality. We are going to try to induce people to eat more eggs, so we shall not interfere with the price of the new-laid eggs during the off season. We cannot do anything, however, unless we are backed up by the poultrymen as a whole. We appeal to you to come and give us a hand to do something for your own benefit.

Mr. Fallon: How is the N.U.P.B.A. in Brisbane going to deal with eggs from outside districts?

Mr. Campbell: The Association has branches in Toowoomba, and also in Warwick. They can collect local eggs on our behalf and send them down. The producers can send them down to us collectively or individually. Of course, commercially, country eggs are not new laid. They are "case eggs."

Mr. Morris: Eggs sent to Brisbane would not be new-laid, but if sent to the N.U.P.B.A. and opened up they would be. Is that it?

Mr. Campbell: Eggs sent down in a case might be the same age as new-laid eggs produced in Brisbane suburbs, and yet not be classed as new-laid.

A vote of thanks was accorded to the N.U.P.B.A. for what it had done in connection with the marketing of eggs.

Mr. Campbell returned thanks for the vote.

TYPE—BREED CHARACTERISTICS.

Mr. Harwood dealt with the subject of type and breed characteristics. He said the main topic throughout the world in connection with the industry was that of type. He said there was becoming too great a distinction between the principles adopted by the exhibition man and that followed by the utility man. One man went to one extreme and the other went to the other extreme. He thought there was only one specialised club in the State. He quoted from authorities in regard to certain points, and condemned the tendency to extravagance in connection with those points. He thought some one should attend the world's poultry conference (utility man, for preference), and get some knowledge there of what was done in regard to type. Regarding Black Orpingtons, it had been suggested that the birds they had developed in Australia should be called "Austral," or some other new name. He certainly

thought they should be judged as pure Australian birds rather than by the Orpington standards. In future, he was going to be more strict in the competitions in regard to standards. The variation in the standards of the Orpingtons had been remarkably changed. There must be something at the bottom of it. In Orpingtons, for instance, a deep, full front was desirable for a table bird, and the utility man had not bred on that line. That would have to be altered, and a medium line established. The trouble with the standards was that they were not definite enough in many respects. For instance, one characteristic might be short legs, but it does not say how short, and they could not get the best egg-producers with the deep, full front, as set down in the standards. A total of 25 points is provided for the head of an Orpington. The standard provides that a comb must be small and erect. The consequence was that, should a comb be inclined to fall on one side, the exhibitor loses points. How many of the Orpingtons in the competitions had a proper clear eye? This mixing up of the standards made it very hard for the breeder to know what to aim for. The place for the utility breed was in the competitions, not in the show pen. Constitution, however, was the main thing, and the lack of constitution was what they were suffering from mainly. However, they were improving, and Southern visitors had been impressed with the constitution of the Queensland birds. Regarding Leghorns, the day of the tiny white bird was passed. Length of back and depth had been brought about by aiming at production. Lung and heart room had also been given consideration. The English standard had established some extremes, but the exhibition man cannot be blamed for breeding for these, because they are what are being asked for.

Mr. Fallon: Is it your intention to judge Orpingtons on the English standard or on the utility standard?

Mr. Harwood: Midway between them. But it is impossible to be too strict. I, myself, would rather hear the so-called Black Orpingtons in the competitions called "Australis" than I would Black Orpingtons. Specialised clubs would do more than anything else to encourage a man to study the breed of a particular bird. He thought the conference might pass another motion in regard to the change of the name of the Black Orpingtons.

The Chairman said: Regarding the suggestion that the so-called Black Orpingtons might be re-named, I do not think we can do anything here. So long as they are called Black Orpingtons, so long will we have to judge them as such. We are not going to be too severe, however.

In reply to a question, *Mr. Harwood* said he had not a bird in the competition which would win a prize at any important show as an Orpington.

Mr. Campbell: Is a white tip on the wing allowed in a Black Orpington?

Mr. Harwood: No. White is not wanted. If you ask for a Black Orpington you do not want black and white. I find that in chickens, however, those which show the most white generally finish by becoming the best sheen birds.

THE COMPETITIONS.

The Chairman dealt with the subject of—

HAVE OUR EXISTING EGG-LAYING COMPETITIONS SERVED THEIR PURPOSE?

"This subject is brought forward because our egg-laying competitions have been running for years. If they have been of value, then we should be in a position to draw certain definite conclusions from the results, either with regard to breeding or feeding or commercial value. Yet, I can find no such deductions drawn from any of the existing competitions. Is it because no such deductions can be drawn? The matter is important, for, if the answer is in the negative, we are wasting time in merely running an annual hen race for the special excitement of a limited number of poultrymen.

"I propose to briefly analyse this matter with regard to the important subject of breeding. This, I think, is the most important question. If our egg-laying competitions have enabled us to breed a more proficient egg-producer, then they have justified their existence. But even so, they must be pointing the way to still better results, or else they should be altered or dispensed with.

"I am submitting figures obtained from the results of the Hawkesbury and the Gatton College competitions. Individual breeds have been dispensed with, and aggregates and averages drawn from a total of the competing birds each year. In the later figures, a distinction between heavy and light breeds is shown. This procedure is entirely justified, for the competitions have largely concentrated attention to one or two breeds. In any case, the general drift of the competition effects will be demonstrated.

Thus the Hawkesbury results read as follows:—

—	Winning Total.	Lowest Total.	Highest Average per Hen.	Lowest Average per Hen.	Average Production per Hen of all Competing Birds.
1902-3 ..	1,113	459	185.5	76.5	130
1903-4 ..	1,308	666	218.0	111	163
1904-5 ..	1,224	532	204	88.7	152
1905-6 ..	1,411	635	235.2	105.8	166
1906-7 ..	1,481	721	246.8	120.2	171
1907-8 ..	1,474	665	245.7	110.8	173
1908-9 ..	1,379	656	229.8	109.3	180
1909-10 ..	1,394	739	232.3	126.2	181
1910-11 ..	1,321	658	220.2	109.7	168
1911-12 ..	1,389	687	231.5	114.5	184
1912-13 ..	1,461	603	243.5	100.5	178
	217.9	100.44			156.4
	233.8	111.83			177.3

Up to this stage all birds had been tested in groups of six.

Individual Hens.					
1913-14 ..	1,360	724	245	23	177
1914-15 ..	1,541	705	288	139	181
1915-16 ..	1,449	506	278	83	192
1916-17 A ..	1,526	924	..	..	162
B ..	1,497	749	..	..	165
1917-18 A ..	1,525	923	288	23	209
B ..	1,613	931	312	49	202
1918-19 A ..	1,448	860	282	36	199
B ..	1,517	815	324	38	189
1919-20 A ..	1,438	988	281	64	203
B ..	1,428	745	303	63	190
	245.8	123.6			175.4
	255.2	146			198.67

While the Gatton results are—

—	Highest Totals.	Lowest Totals.	Highest Average per Hen.	Lowest Average per Hen.	Average per Hen of all Competing Birds.
1906-7 ..	1,480	814	246.7	135.7	190.8
1907-8 ..	1,538	589	256.3	98.2	180.1
1908-9 ..	1,374	902	229.0	150.3	202.8
1909-10 ..	1,532	939	255.3	156.5	207.1
1910-11 ..	1,520	1,001	253.3	166.8	207.8
1911-12 ..	1,391	631	231.8	105.2	194.8
1912-13 ..	1,534	968	255.7	161.3	207.5
1913-14 ..	1,564	1,109	260.7	184.8	218.6
1914-15 ..	1,545	1,165	257.5	194.2	225.8
1915-16 ..	1,530	871	255.0	145.2	222.8
	248.12	141.5			197.72
	252.14	158.14			213.9

Up to this stage all birds had been tested in groups of six.

1916-17 ..	1,542	915	289	62	209.7
1917-18 A ..	1,652	822	272	36	200.0
B ..	1,470	769	335	36	182.8
1918-19 A ..	1,573	936	303	110	198.0
B ..	1,389	869	290	115	187.0
1919-20 A ..	1,627	1,111	289	121	208.0
B ..	1,619	953	335	86	204.7
	259	150.4			198.6

Examination of these tables seems to emphasise that we have not improved our birds' capacity by any breeding information got from the competition results.

Thus, an examination for the highest group totals shows a fairly steady increase with time in the Hawkesbury results, as also at Gatton. This is more evident by grouping together successive years and averaging, as shown in figures alongside the brackets.

In the same way there seems to have been a rise in the lower limits at Hawkesbury, but not so at Gatton.

This change in the general average of all birds is still less marked; in fact, there has been a falling-off at Gatton during the last few years.

We can gather more information by examining the highest and lowest average per hen in each year, especially with reference to the highest and lowest individual score in the single-hen tests of latter years.

Thus, at Hawkesbury, we have a pen averaging 246.8 eggs per bird, and the next year, an average of 245.7 eggs per bird. It is certain that each bird of the group did not lay the same number of eggs; therefore, some laid more and some less. Thus, we are forced to the conclusion that there existed in our flocks, in 1906, individual birds of equal capacity with those since found by single testing. For there is no indication in the single tests of a capacity beyond the possibility of individuals undiscovered in the groups.

The same argument applies to the lowest capacity, and the single testing shows the constant recurrence of birds of low order. Now, it must be taken that one of the effects of testing layers would be to induce breeders to use their proved higher producers. In group testing we can readily understand that indifferent producers would be included in the breeding pens. But this should not obtain where the birds are single-tested. Yet this single testing does not seem to have had any effect in raising the higher limit, nor does it seem to have prevented the production of a fairly definite proportion of the lower grades. Certainly, there seems to have been an increasing improvement in the averages, but is this due to breeding, or is it merely the result of better technique in rearing and feeding? Certainly, much of the earlier improvement was due to this cause, and this fact detracts from the importance which can be attributed to breeding. However, the results do indicate that it is gradually becoming easier to produce birds of the higher capacity, while fewer of the lower grades are reared. The progress made, however, is disappointing, for the possibility of improvement should be right up to the average of the winning pens.

Now, it is necessary to go back to the origin of these egg-laying competitions. It is important to note that they were called competitions, and this is exactly what they are. When inaugurated, the conditions were designed in such a way as to attract the interest of poultrymen. In effect, they demonstrated large variations in the capacity of different hens to lay eggs. But in no degree could the organisation be deemed to be carefully arranged for purposes of scientific experiment. The variability of the material supplied for test alone was sufficient to obviate this.

Later, when the single tests were introduced, a distinct effort was made to convert the competitions into a breeding test. This was done, however, without elimination of the competition element. Again, the variability of material supplied for test destroys the value as an experiment. Hence the egg-laying tests have remained competitions chiefly, and until there is a radical change in conditions it cannot be hoped that they will yield far-reaching effects.

Thus several points have arisen during the competition.

A. *The weight of egg.*—This is a point required for commercial value. But who can learn from the competition results whether weight of egg is an hereditary characteristic, or whether it is largely determined by nourishment—nourishment, not during the period of laying, but nourishment from the time the mother was mated up, right through incubation and rearing, and up to the stage of laying. Mr. Harwood advocates early incubation and forcing the pullets into an adult moult prior to their commencement to lay. In the same way he likes to force his stud birds into a moult early and allow them to feather up well before mating. May not this provision, or some similar provision, for nourishment of the on-coming pullet be a greater factor in determining weight of egg than hereditary influence? It seems more than probable, because the converse would seem to be certain, viz., that a starved pullet would not have the power to produce sufficient egg material to form fully-sized eggs.

B. A second point was soon impressed. In the race for high fecundity and number of eggs, there was undoubted neglect of stamina, constitution, and type. Of these, perhaps, type was the least important, but the other two characteristics were absolutely essential if our poultry were not to be ruined. The various competitions took action in this respect, and for combating this evil I like the Gatton regulations best, because all competing birds are judged, and so the whole public is in a position to know the grading of each pen with regard to these important features. The winning pen may be of no type, or possess low stamina, or it may be classed as first grade. If so, how great the advantage to all concerned, and, if not, then the breeder knows his position.

But fundamental behind all these features is whether we can transmit with reasonable certainty the good characteristics of tested hens. It is a problem of breeding, and the competition results give practically no information with regard to this. How can they? Pens are accepted from practically any poultry-raiser. No knowledge of the breeding is submitted. There is no systematic follow-up of tested birds. Of course, all this may be done in individual yards, but, if so, it is kept secret. The competitions are merely a record of results obtained by design or chance by various breeders. As such it is impossible for them to gather information of value to the problem of breeding.

That some breeders are working on good lines is indicated in the single hen records. Here we find some breeders putting forth, year after year, pens of exceptional equality and of high fecundity. In other pens we find a big variation between the capacities of the birds entered.

Again, we find some competitors holding their position for several years, and then suddenly, and without apparent reason, losing their place near the top. When enquiry has been made it is nearly always found that this is due to change of cock bird. It must not be forgotten that the male is one side of a mating, and much more than one side where mass mating takes place, as with poultry. It is quite understandable, therefore, that a breeder may owe his continued success for a few years to the chance possession of a prepotent male. Yet the competition conditions make no provision for gleaning information with regard to this.

Further, this side of the problem is rendered of more importance because of the experiments of Dr. Raymond Pearle. Dr. Pearle asserts, and he is supported by a mass of experimental data, that high fecundity is transmitted by the male bird and not by the hen. That is, that a high-producing hen cannot transmit high fecundity to her daughters, but she may transmit her power through her sons. The pullets derive the egg-laying capacity from their sires and not from their dams. —

If this is so, why our extreme care in testing hens and our utter neglect in testing cock birds? Perhaps it is our failure in this respect which accounts for failure of our competitions in effecting a truly evident improvement in fecundity.

Certainly it would be more difficult and complicated to test cock birds than to test hens. But the indications are that by doing this we could establish real and permanent improvement in our flocks. Therefore I would suggest the following tentative scheme:—

- (1) Hens would be tested to find good and bad layers.
- (2) Three hens of each class would be mated with the cock bird under test and trap nested. Twenty-five eggs of each class would be incubated.
- (3) The pullets in equal numbers from the good and bad layers to be single tested.
- (4) Cock birds producing nothing but good layers would be given a seal ring and certificate.
- (5) Cockerels, by a certified cock bird and out of a proved good layer, would be eligible for future test. In any case, these cockerels should be valuable stud birds.
- (6) Any cock bird producing bad layers from proved good layers to be condemned.

DATE OF CONFERENCES.

Mr. Parker: Those of us who have attended these conferences appreciate the good we get from them, and we always go away feeling that we have learned something. At the same time I think the conferences being held at this time of the year makes it rather awkward for many breeders, as it is in the middle of the incubating season. It was exercising their minds in Brisbane that some other date might be more suitable. Our Society suggested that it be held in March.

The Chairman: I would like it known that in this matter we at the College are only too willing to alter the date to suit the convenience of most of you. We are not in any way committed to September, and if you have found that that date is not convenient, and you give us a date that you are confident will suit better, we will undoubtedly hold the conference somewhere near the time you suggest.

Mr. Campbell strongly supported the proposed alteration of the date. He knew that it was very inconvenient for many breeders to get away. Another reason for holding the conference in March was, that they would be able to see the complete scores in the competitions, which would be an object lesson.

The Chairman: I will take this as a motion that the next conference should be held in March.

The motion was carried.

GENERAL MATTERS.

Mr. Walters: Anyone looking at the scores would think that Orpingtons and White Leghorns were the only breeds that can lay eggs. Could not the College show some other breeds, as non-competitors, to show against the breeds in the competitions, for the purpose of comparison?

The Chairman: I think we should not compete, or enter non-competitive birds against those in the competitions, but for the sake of the College itself, and for others who might inquire, we might do something in the way of an experiment in that direction.

Mr. Holmes: I think the stipulation that each competitor must be prepared to supply 50 stud birds, or 100 settings of eggs of the same breed as his birds in the competition, should be strictly enforced.

Mr. Cole: Are you going to debar a man because he might not, for instance, be able to supply more than 40 birds?

The Chairman: I regret that I have not the organisation to enforce this regulation, not because I want to kill the enthusiasm of young men, but you have to recognise that these competitions are to a very great extent the medium whereby breeders are advertised. A man is advertised because his birds come near the top. We ask that a competitor should be able to supply 50 stud birds or 100 settings of eggs of the same breeding, though not, of course, from the same bird. We expect a competitor who signs these declarations to observe them, and be able to adhere to them. To carry out an inspection of the yards as suggested by Mr. Holmes is a practical impossibility, but if the breeders of the State think there is anyone doing harm by succeeding at this competition and then selling birds which are not of the same breeding—birds, in fact, which have been picked up in markets, and which are of indifferent breeding—the Associations should black-ball such a person. You are asking the College to take on the work which justly belongs to your Associations. As a matter of fact, we have taken action against this sort of thing during my time at the College.

Mr. Harwood: If you become a member of an Association in England, one of the benefits you receive is that you are protected from illegal practices. If any exhibitor has been proved to have carried on illegal practices, he is tried by the Poultry Club of England, and blacklisted. The Club publishes each year the names of such persons.

Mr. Murray: I think we ought to increase the number of birds in the pens to twelve. I think, also, that the incubator house is not a credit to the College nor to the Government.

The Chairman agreed that the house was not what it should be.

Mr. Parker: I do not know that we get the most out of these conferences. I think we might discuss such questions as the methods of feeding, &c. We should introduce some of the questions ourselves, and not leave all the work to the College people.

The Chairman: I like this suggestion. If there has been one fault in connection with the conferences, it is that to a great extent the work has been left largely to the College. Last year was the only exception, when the N.U.P.B.A. was asked to take up the matter of marketing eggs. It lies rather with the poultry people themselves to discuss subjects and then bring them before conference. I would suggest that you bring this matter up in your Associations during the time before the next conference, and if you have any subjects for discussion, you might ask the College to have them included in the programme for the day. I hope you will have them in in time to be included in the next conference, which, I dare say, will be held in March next.

Votes of thanks were accorded to the Principal and Mr. Harwood for their assistance and the information that they had supplied, and the conference terminated.

The visitors then inspected the feeding of the birds, and after partaking of refreshments, were driven to the College siding, where they embarked on the Toowoomba or Brisbane train.

The Horse.

THE SUFFOLK PUNCH.

We have several times in this Journal discussed the merits of the Suffolk Punch, both as a draught horse and as a saddle horse. The following extract from the "London Live Stock Journal" will show that this class of horse is greatly appreciated in England, and commands high prices from breeders and agriculturists:—

SUFFOLK HORSE SOCIETY'S SALE.

There being a record entry of 345 animals for this year's summer sale of Suffolk Punches, held under the auspices of the Suffolk Horse Society, at Ipswich, it was found necessary to spread the sale over two days. The opening day of the sale, with which there was also associated a show of the breed, was on Wednesday, when foals and mares with foals were offered for sale. There was a big collection, in which the horse foals strongly predominated. Whilst there was a fairly good trade for these, the demand for the filly foals was exceptionally keen. The mares, of which there were some nice specimens, sold readily. A very large company of buyers were present from all over England, and also from Ireland there was strong evidence that the Suffolk Punch is making friends in places far removed from Suffolk, and not a few were wanting to start studs. Some highly promising foals were bought on behalf of the Minister of Agriculture by Captain Trollope, and among these were two smart young colt foals by Mendham Gold Boy and Morston Gold Guard. The foal by the latter horse was the second prize-winner in the class for horse foals, and he was bred by Mr. Threadkell, of Framlingham.

"Filly foals made a very nice show, and the trade may be regarded as excellent throughout. The winning foal, belonging to Mr. E. H. Williams, of Alderton, was a compact, well-made daughter of Sudbourne Arab, of nice colour, and she sold to Mr. J. Rose, of Stradbroke, for 165 guineas. Mr. Rose, who recently demonstrated at the Framlingham and Halesworth Show that he has the real breeder's eye, likewise bought another lovely filly foal belonging to Mr. Williams for 145 guineas. The second prize filly foal by Sudbourne Beau Chief, a beautiful deep red chestnut, which is likely to make a fine mare, did not reach her reserve, bidding for her reaching 240 guineas. The third was an exceptionally nice daughter of Morston Gold Guard, who belonged to Mr. F. Newton Pratt, who sold, well worth the money, to Mr. R. F. Wrinch for 105 guineas. Many of the filly foals exceeded the 100 guineas figure, and among those which went to distant parts of the country was Mr. James Forest's well-bred daughter of Sudbourne Beau Chief, who made 120 guineas, to Mr. R. W. Cooper, of Guist. Then Major Workman, who came from Ireland, secured a typical Punch filly foal, bred by Mr. A. Carlyle Smith, and he likewise acquired her dam, Ashmoor Trophy, a beautiful daughter of Sudbourne Arab, for 300 guineas. Mr. A. G. Welch, of Worlingham, near Bectles, acquired some very useful filly foals, among which is the 103 guineas youngster by Earl Grey and one by Cider Cup, bred by Mr. J. W. Moore, of Peasenhall, which cost him 101 guineas. Mr. H. G. Cushion bought another of the progeny of Morston Cider Cup and bred by Mr. M. Moore for 100 guineas.

"It was a very attractive contingent of eight mares and their foals which were consigned from Bawdsey Stud of Sir Cuthbert Quilter, and for them an average price of £280 was made, the principal buyer being Mr. W. Kindred, of Great Glemham, who gave up to 430 guineas for a four-year-old by Bawdsey Marshall Ney, a sire who has left some fine stock behind him. Another nice daughter of that stallion cost Mr. Kindred 350 guineas, but for a third, a six-year-old by the same horse, he gave place to Mr. A. G. Welch. It was a typical lot of Punches which Mr. Kindred acquired, most of them, it is understood, for the formation of the new stud which Mr. P. A. Bayman is forming at Letheringham Abbey. Mr. E. H. Preston was another keen buyer, and his purchases included, for 300 guineas, a charming mare and her foal. Captain Borrett, of Cransford, another new comer into the breed, secured for 350 guineas a well-bred five-year-old mare by Ashmoor Sir Grey; she was reserve in her class.

"The judging for the prizes was undertaken by Mr. Godfrey Hempson and Mr. R. H. B. Wilson, and the sale was conducted by Mr. Alfred Preston, who has officiated at the society's functions from their very commencement some thirty years ago.

"The results of the first day's sale may be considered eminently satisfactory, the total proceeds being £12,457 4s. for 104 foals and 38 mares."

The Orchard.

CITRUS GROWING IN CALIFORNIA.

We are obliged to Mr. R. Henderson, Edinburgh, for the following notes received by him from a correspondent in California on the subject of Citrus Growing in that State:—Having noticed in a recent number of your Journal (July, 1920), an article on 'Citrus Growing in California,' by the Hon. J. M. Hunter, I became interested, and wrote to Mr. Griffith (Azusa, California) for further information.

His answers were very interesting, and the following extracts may prove so to other citrus growers:—

"Fertilisers.—In the spring of the year we put on our groves, packing house tankage, a by-product of the meat industry, at the rate of 15 to 25 lb. per tree, according to size. This tankage averages 8 per cent. nitrogen and 8 per cent. phosphoric acid. Any time during the year, preferably late summer or fall, we put on animal manures at the rate of 15 to 30 tons per acre, according to the size of trees. This is either broadcasted down the rows and cultivated under, or put in deep furrows made especially for this purpose and then covered. The latter is the latest, and I think the best, method yet devised. In early fall, when our rainy season comes on, say, 15th September, we sow our orchards to a legume, such as field peas, clover, *Mellilotus indica*, &c., and allow this crop to grow undisturbed by cultivation during the winter. About February or March, depending upon the weather, we disc harrow this growth under for "green manure." We sometimes use so-called inorganic fertilisers, such as ammonium sulphate, and sodium nitrate; however, I seldom use these except as "tonics" for decadent trees.

"Irrigation.—Our rainy season here begins about 1st October, and lasts until about 1st May. I say 'about,' for no two years are the same as to rainfall. About the time that the rainy season closes we begin irrigating our grove. First we go up and down the rows with a furrowing machine, which is so designed as to leave behind it three furrows. When a round of a row is completed we have six furrows. Our water is conducted in a huge system of cement piping from the mountains, and led down to our private pipelines through the cement pipes mentioned above, which belong to a company formed especially to render this service. Each ranch is entitled to so many shares (reckoned according to the acreage of the ranch, or grove) in this company, which, as you see, is co-operative. So the ranchers really own their own water companies and their distributing systems. Every ranch is equipped with cement lines running at the head or upper side of the grove, with standpipes coming up above the ground for each row. When irrigation is desired the water is turned into these private lines from the company's lines, and, running down the private line, rises in these standpipes and flows out, regulated, of course, in its flow into the furrows by a large cap, which can be screwed to a larger or smaller opening. The length of time the water is allowed to run in the furrows depends upon the character of the soil. Heavy types take a less amount of water than light or sandy types. We in this neighbourhood irrigate consistently every thirty days during the dry season.

"Cultivation.—Two or three days after irrigation ceases on any lot we go over the ground, both up and down the rows and crosswise with a cultivator. We use Fordson tractors on this ranch and pull a 6-ft. cultivator behind them. When we have any litter on the ground, like there is after the first discing-in of the winter cover crop I mentioned above, we continue to use the discs behind the tractors until all is in the ground.

"Grading.—The grading and sale of the fruit is handled exclusively by the California Fruitgrowers' Exchange, a co-operative marketing corporation. If I should attempt to give even a glimpse of the working of this huge Exchange I would wear out this typewriter."

ERADICATION OF WHITE-WAX SCALE.

The Director of Fruit Culture, Department of Agriculture and Stock (Mr. A. H. Benson) has received the following report on Experiments in Combating the White-Wax Scale, in the Toowoomba District, from Mr. W. Leslie, Assistant Instructor in Fruit Culture:—

I beg to report as follows on experiments carried out with a view to proving the best means of combating White-Wax Scale:—

This pest developed excessively in Toowoomba district during the months of April and May, and the following control measures were tried:—

I.—FUMIGATION WITH HYDROCYANIC ACID GAS.

A pomelo tree in the garden of R. Walsh, Goodwood, Newtown, was infested with White-Wax Scale. A gas-tight bell tent was placed over it and hydrocyanic acid gas was generated inside the tent by placing there on the ground a vessel (earthenware) containing a mixture of $4\frac{1}{2}$ oz. water and $1\frac{1}{2}$ oz. sulphuric acid, into which mixture $1\frac{1}{2}$ oz. of potassium cyanide was dropped. The tree was enveloped in the gas for about forty-five minutes.

II.—SPRAYING.

A mandarin tree in the nursery of R. W. Winter was heavily infested with the pest, and two insecticides were tried:—

(a) *Kerosene emulsion* was made by dissolving 4 oz. soft soap in one gallon of hot water, and then adding one quart of kerosene, the mixture then being vigorously agitated until a stable emulsion was formed. Water was added to make up to four gallons. This was sprayed on the tree so as to thoroughly wet all parts.

(b) The *Resin-Soda* solution was applied twelve days later. It was made by boiling $\frac{1}{2}$ lb. resin and $\frac{1}{2}$ lb. washing soda in 2 gallons of water, and, when dissolved, water was added to make up to 4 gallons.

RESULTS.

I. *Fumigation*.—A marked check appeared to be given to the growth of scale on the pomelo tree during the first two weeks after cyaniding, but signs of further development of the pest appeared subsequently. It appears that the unprotected young and most of the mother scales had been killed by the gas, but that some of the adult females remained alive, or that young developed under the protection of the bodies of mother scales subsequent to the cyaniding. The fumigation might have to be repeated in about twelve days' time.

II. *Spraying*.—Ten days after spraying with kerosene emulsion, the mandarin tree was examined and a number of young scales were observed. After spraying with the resin-soda solution, this tree was again examined, and a number of living young were seen and some of the adult scabs were alive and fresh.

CONCLUSIONS.

The conclusion arrived at was that after excessive infestation, any control measures were difficult to apply so as to effectively reach every insect, and that repeated spraying or cyaniding would be necessary to secure eradication, and, further, that the proper time to apply control measures would be in the early stage of infestation, when the insects were all young and but slightly protected by their waxy covering. The month of February appears to be the time for this early stage in the life of the pest in Toowoomba district.

TO GLAZE A CEMENT BARREL.

For the purpose of keeping meat in a cement barrel, the following preparation will, in all probability, accomplish the purpose:—Dilute neat commercial water-glass with about 25 per cent. of water, and apply a coat of the hot solution to the barrel with a brush. When thoroughly soaked into the wood, repeat the application. Allow it to dry. Then give it a coat of a solution of one part of sodium bi-carbonate to 8 parts of water, and let it stand till dry. The carbonic acid of the bi-carbonate separates the silicic acid from the water-glass which is soaked into pores of the wood, silicates the wood, and so makes it resistant to liquids, very durable, and easily cleaned.

Tropical Industries.

EXPERIMENTS WITH A NEW CACTUS RUBBER.

By EMMET S. LONG, in "The Planters' Chronicle," Coimbatore, S. India.

It has recently been the writer's privilege to experiment with a gum extracted from the American cactus, and the results have so far been so entirely satisfactory that the subject should undoubtedly be of interest to everyone connected with the rubber industry. The war has certainly disclosed the necessity, or at least the desirability, of producing on as large a scale as possible a portion at least of the rubber requirements of this country, and for this reason, as well as for the economic betterment of the rubber industry itself, there has resulted considerable activity in the investigation of this important question.

Several years ago the writer had occasion to do considerable experimenting with the extraction and compounding with rubber of a gum derived from the Ocotillo plant, more particularly for the purpose of obtaining a gum which would replace guayule. This plant ranges from 5 to 25 feet in height, growing extensively in certain parts of Arizona and California. The results were satisfactory to a certain extent, but, due to the solvent-distillation method of extraction employed, the gum contained a large percentage of resins which seriously affected the cure when used in large percentages in the compound. Later, the destructive-distillation process with subsequent refining was evolved with the assistance of Government chemists, and it is reported that a much superior product is now being produced in large quantities at the large plant in Arizona.

The cactus gum mentioned at the beginning of this article is found in paying quantities in two different varieties of cactus—one the spineless, or cultivated cactus developed by Burbank, and the other the prickly-pear or wild species. Spineless cactus has been raised in many parts of Southern California as food for cattle. It was soon learned, however, that many cattle died, probably as a result of the insoluble gum content. The plant consists of a number of lobes somewhat similar in shape to an inverted hot water bottle, each lobe projecting outward and upward from the edge of the one underneath, the number of lobes depending upon the age of the plant. It is easily propagated by breaking off these lobes and planting them in the ground. The plant is very hardy, and has the advantage of being easily cultivated upon practically worthless soil, or in localities where the rainfall is very slight.

Prickly-pear, or *Opuntia vulgaris*, grows extensively in many parts of Arizona, California, Nevada, and other tropical parts of the United States. It is somewhat similar in structure to the spineless cactus, but is covered with long, sharp needles. It bears an edible fruit of a purplish colour, also covered with spines. Like the spineless, it is very easily propagated, and attains a height of 7 or 9 ft. Unlike Ocotillo and many other gum-bearing plants, the rubber in these two varieties of cactus occurs as a latex and yields a sticky white liquid from the abraded surface if pressure be applied by the fingers. By special treatment of the latex and subsequent refining, an amber coloured gum resembling smoked sheet in colour and guayule in physical properties is obtained, although the gum, when thoroughly dried, is considerably less plastic than guayule. It is reported that the gum can be produced at a price to compete favourably with guayule and crude rubber.

Following is a summary of some of the experiments made with gum from the spineless cactus:—

SAMPLE 1.						Per cent.
Smoked sheet rubber	..	..	..	..	..	50
Cactus rubber	..	..	..	..	..	40
Compound (mineral ingredients)	..	..	..	..	..	10

This compound was mixed upon the mill in the usual manner and contained only the amount of sulphur usually required to vulcanise a stock having 90 per cent. smoked sheet. It mixed easily on the rolls at a much lower temperature than that which would have been required for pure smoked sheet. The next day test strips were cured in the press, and were found to have high tensile strength and elasticity, showing that the gum vulcanises perfectly in about the same length of time required

for plantation rubber. Another portion was used to friction a sample of belting duck which was found upon examination to be thoroughly impregnated with the gum. A very tacky cement was made from the remaining portion by dissolving in benzol.

SAMPLE 2.

						Per cent.
Smoked sheet	..	..	..	..	..	20
Auto reclaim	..	..	..	..	..	20
Cactus rubber	..	..	..	..	..	20
Compound	..	..	..	..	..	40

In spite of the fact that this stock was mixed on a relatively cold mill, it retained a sticky surface after calendering, and showed no tendency to bloom in the raw state. It would seem from this that the use of the gum in repair stocks and especially in those containing large amounts of carbon black would be advantageous, due to the necessity of preserving a tacky surface indefinitely, and the lower temperature at which the stock could be milled would minimise the danger of burning when use is made of certain organic accelerators. Part of Sample 2 was used to skim-coat and cover the fabric mentioned above, which was then made into a piece of belting.

SAMPLE 3.

						Per cent.
Smoked sheet	..	..	..	..	..	10
Auto reclaim	..	..	..	..	..	20
Cactus rubber	..	..	..	..	..	17
Compound	..	..	..	..	..	53

It was the object of this mixture to estimate the value of the gum in a cheaper compound containing a larger percentage of minerals. No difficulty was encountered in milling, and the stock was made into various kinds of articles of comparatively good quality.

SAMPLE 4.

						Per cent.
Cactus rubber	..	..	..	..	..	10
Reclaimed	..	..	..	..	..	60
Compound	..	..	..	..	..	30

This was a regular heel compound in which 10 per cent. smoked sheet would ordinarily have been used. The smoked sheet was replaced entirely with the cactus rubber without reducing the quality of the heels so far as could be determined. It is interesting to note that the reclaimed rubber used in this case would not stick to the rolls and could not be milled until about 2 lb. of the cactus rubber was added, when it immediately began to spread out evenly over the roll and continued to adhere thereto until the milling was completed. A number of rubber heels were made from this stock, all of which appeared to be of good quality.

It is the opinion of the writer, as well as of others who assisted in the experiments, that the gum is in every way equal to guayule and in some respects superior, among which may be mentioned the readiness with which it vulcanises and the extent to which it will actually replace crude rubber without an apparent reduction in the quality of the finished product. This would evidently place it in a class with crude rubber itself. For use in frictions where penetrating qualities are necessary the gum possesses this property to a marked degree.

The results of these experiments indicate that it may be only a question of time until America may have a new and important industry—the production of rubber from her desert and waste lands. Los Angeles is already the cynosure of the eyes in the rubber world as the nucleus of a new and rapidly growing rubber manufacturing centre. The production of long-staple cotton of highest quality in Southern California has quickly sprung from infancy to a well recognised commercial success, and if the cactus rubber possibilities materialise, the United States and even California will be able to produce a complete tire from her own raw materials.—“The India Rubber World.”

ROOT DISEASE OF CACAO.

Although cacao (or, as the word is usually pronounced here, "cocoa") is not grown in Queensland, except experimentally, we publish the following article on "Root Disease of Cacao" which appeared in the journal of the "Jamaica Agriculture Society" for June and July, 1920, for the benefit of our many readers in tropical countries, especially in Papua, where cacao is planted in several localities.

The article is originally published in the "Bulletin of the Department of Agriculture," Trinidad (April). It is very long and very technical, and only a portion of it can be placed before our readers—viz., the introduction, which is as follows:—

"The death of cacao trees from 'root disease' has been known in the colony (Trinidad) for a long time, but does not appear to have been specially investigated. The cause of death has often been assigned vaguely to 'canker at the root.'

"The root diseases of cacao and limes in some of the West Indian islands have been the subject of research by Mr. W. Nowell, D.I.C., Mycologist on the staff of the Imperial Department of Agriculture for the West Indies. His results are published in a paper 'Rosellinia Root Diseases in the Lesser Antilles,' "West Indian Bulletin" XVI, 1917, 31-71, with twelve illustrations.

"During Mr. Nowell's visit in 1918 to investigate the froghopper blight of sugar-cane, he expressed to me his belief that although rosellinia had not been recorded as a cause of root disease of cacao, &c., in Trinidad and Tobago, it would be found here, considering its wide distribution in the West Indies and Tropical America. Root disease of cacao is not very common in the colony, and as Mr. Nowell had very little time available he had few opportunities for searching for it. A few trees were examined, but without definite result.

"During his second visit in 1919, Mr. Nowell made special investigations in this connection. In one section of a cocoa estate there was found the following comparative results:—

T. Apparently healthy trees	..	..	..	..	4
S. Sickly trees	..	..	..	..	3
D. Dead trees	..	..	..	..	2
— Missing trees	..	..	..	..	1
T. Young supplies	..	..	..	..	9
Total	..	..	..	..	19

"Mr. Nowell examined the trees, &c., and diagnosed the cause of disease as '*Rosellinia Pepo*' which is described in detail later."

* * * * *

"The disease is not considered a new or introduced one, as it is common in the stumps of all rotten trees; it is, therefore, a serious disease, and, when neglected, it may lead to severe losses. Cocoa trees have been killed by the fungus, and other plants which have been put in for temporary fillers, such plants as dasheens (cocoas), bananas, pigeon pea, cassava, and overlook beans have all been attacked.

"The fungus which causes the disease is found in rotten stumps. It is also common in old plantations of cocoa when the shade trees have been cut out or died, and the stumps have been left. It is particularly virulent in breadfruit and pear trees. Almost everyone here in Jamaica knows of the white fungus commonly found in the roots of dead pear trees. We are not all agreed that this is found on the stumps of breadfruit trees, probably because these do not die out so rapidly as pear trees, and there are, therefore, very few dead stumps of breadfruit trees; at any rate, this fungus does not affect the stumps of breadfruit here, according to our knowledge, as badly as the stumps of pear trees. The disease is also common in lime trees in Dominica, and one lime planter, who has anticipated events, has separated his trees throughout by trenches in both directions, so that each stands in a square plot cut off from the rest, so that if one should be attacked the disease cannot cross through the trenches. These trenches are not made for drainage, but

simply as a protection against the spread of this disease through the soil. We have also seen the white fungus on the roots of coffee trees, which is probably this disease, but as the fungus cannot stand dry conditions or exposure to the sun it is not probably dangerous to the average coffee plantations. It is most common in heavy shade in damp situations. The death of cocoa trees here, often set down to the attack of the grub usually called 'Makaka,' may be really caused by this fungus. This is a matter for observation and inquiry.

"When cocoa trees assume a sickly appearance and the leaves begin yellowing, a search should be made by laying bare the collar and the main roots, and if the white fungus is seen, specimens of the wood might be sent up to the microbiologist here. The disease may spread along some of the roots, or it may get full hold of the collar, and by girdling trees cause very quick death. All dead trees and rotten stumps should be removed from any cocoa cultivation, and no roots should be left in the soil, if possible. Lime should be applied as a disinfectant. No logs should be left standing about, either. There is no cure for infected trees when they are once severely attacked, but, if taken in hand early, the principles of actual treatment are two:—

- (a) Complete excision of diseased tissues.
- (b) Exposure as complete as possible of the diseased part and its surroundings to a free circulation of air, with the object of making conditions too dry for the fungus to exist.

"The cases which repay treatment are those arising from surface infection, in which, on inspection, the local nature of infestation appears to be clearly defined. Severed roots should, as far as possible, be removed; cut surfaces should be cleanly trimmed and dressed with paint. Excavations made to get at the seat of injury should be left open. All cut material should be carefully removed and burned. It would be a good practice to dig a trench around each infected tree, and prevent the disease passing through the soil if the treatment is not successful. Disinfection of the soil, in the case of a few infected trees has been tried, and so far has not been successful. Lime has been used, and, in Grenada, iron sulphate. One planter at least has used sulphur, a well known fungus destroyer in other connections. It is safe to say that at the present time there is no disinfectant available which is cheap enough to be used in sufficient quantity to sterilize any considerable area of ground. The lime disinfectant is easy to get and easy to use, and is available, when trees are attacked, to prevent spread of the disease. Then, of course, lime is useful to the soil and to the plants in other directions."

INTERSTATE SPECIAL FRUIT TRAINS.

The fruit special run by the North Coast Fruitgrowers' Association on 7th October carried 167½ tons, of which 97½ tons were for Melbourne, and 70 tons for Sydney. The total comprised 2,664 cases of bananas, 1,633 cases of pines, 20 cases of citrus, 20 cases of papaws, 74 cases of tomatoes, and 69 bags of beans, Melbourne taking 1,823 cases bananas, 674 cases pines, 18 cases citrus, 1 case papaws, and 49 cases tomatoes, and Sydney taking 841 cases bananas, 959 cases pines, 2 cases citrus, 19 cases papaws, 25 cases tomatoes, and 69 bags of beans. District loadings by tonnage was: North Coast to Melbourne 87½ tons, and 36½ tons to Sydney, total 124 tons; Cleveland line to Sydney, 10 cwt.; Currumbin to Melbourne, 10 tons; Tweed Heads to Sydney, 33 tons. District loadings by cases were: North Coast to Melbourne, 1,583 cases of bananas, 674 cases of pines, 18 cases of citrus, 1 case of papaws, and 49 cases of tomatoes; to Sydney, 48 cases of bananas, 952 cases of pines, 2 cases of citrus, 19 cases of papaws, and 69 bags of beans; Cleveland line to Sydney, 7 cases of pines and 25 cases of tomatoes; Currumbin to Melbourne, 240 cases of bananas; and Tweed Heads to Sydney, 793 cases of bananas. Of the North Coast loadings 42½ tons were transhipped at Landsborough, and comprised 903 cases bananas, 161 cases pines, 8 cases citrus, 20 cases of papaws, and 25 bags of beans.

Two fruit specials were run by the North Coast Fruitgrowers' Association, one ex Wallangarra, on 1st October, with North Coast loadings, and one on 2nd October, with North and South Coast loadings. The total weight was 179 tons, of which 85½ tons went forward to Sydney, and 93½ tons to Melbourne. The goods comprised 2,074 cases bananas, 2,252 cases pines, 409 cases citrus, 189 cases tomatoes, 33 cases papaws, and 77 bags of beans. Melbourne took 1,349 cases bananas, 708 cases pines, 409 cases citrus, and 189 cases tomatoes; Sydney took 725 cases bananas, 1,544 cases pines, 33 cases papaws, and 77 bags of beans. District loadings, by tonnage were: North Coast to Melbourne, 79½ tons, to Sydney 56 tons, total 135½ tons; Currumbin to Melbourne, 14½ tons; Tweed Heads to Sydney, 29½ tons. Of the North Coast loadings, 38 tons were transhipped at Landsborough, and consisted of 725 cases bananas, 221 cases pines, 18 cases citrus, 33 cases papaws, and 39 bags of beans.

Botany.

ILLUSTRATED NOTES ON THE WEEDS OF QUEENSLAND.

By C. T. WHITE, F.L.S., Government Botanist.

No. 19.

BURR BUTTERCUP (*Ranunculus muricatus*, L.).

Description.—A rather fleshy, stout, spreading, annual plant. Stems and leaves smooth, quite glabrous or bearing a few weak hairs. Leaves fairly large—up to 4 in. across, on stalks of 2 in. in the lower part of the stem—gradually getting much smaller towards the flowers, usually more or less distinctly 3-lobed, the lobes again coarsely toothed; flowers yellow, small (scarcely $\frac{1}{2}$ -in. across). Carpels (seeds in the popular sense) 8-16 in the centre of each flower, compressed, when ripe hard, 4-5 lines long, prominently beaked at the apex, and bearing on each face a number of hard, spiny tubercles.

Distribution.—A native of Southern and Eastern Europe (Mediterranean area), North Africa, Western Asia, also occurs in North America, but probably an introduction from Europe. It is a common naturalised weed in temperate Australia. In Queensland, it was first noted about Toowoomba on the Darling Downs, specimens being collected there by Mr. H. A. Longman in September, 1909, and forwarded to the late F. M. Bailey. Since that date it has spread to other localities in the southern parts of the State, but can hardly be classed as a very bad weed.

Common Names.—Burr Buttercup, Rough-seeded Buttercup, Spiny-fruited Buttercup, and Spiny-fruited Crowsfoot are names that have been applied to it.

Remarks.—As a whole, the genus *Ranunculus* is one of very little economic importance. Some of the species are poisonous, some are very beautiful flowering plants, but most are weeds of moist wet places. There is nothing in particular to record about the present plant; it is not poisonous, but stock do not seem to touch it. There is some danger of the burrs damaging wool if growing in country where sheep are running.

Eradication.—So far as observed in Queensland, it is not a particularly aggressive weed, and calls for no special methods of eradication. It is a moisture-loving plant, and is almost always found in damp, undrained land, the drainage of which ends in its practical eradication.



PLATE 20.—BURR BUTTERCUP, OR ROUGH-SEEDED BUTTERCUP (*Ranunculus muricatus*).

A. Shoot, natural size.

B. Flower, enlarged.

C. Head of carpels (seeds), enlarged.

D. A single ripe carpel (seed), natural size and enlarged.

Entomology.

CANE GRUB INVESTIGATIONS.

The General Superintendent of the Bureau of Sugar Experiment Stations has received the following report upon Cane Grub Investigations, from the Entomologist, Dr. J. F. Illingworth:—

“The weather has been ideal for the growth of sugar-cane—warm days with intermittent light showers. Plant cane has never looked finer, and weeds are held well in check by better methods of cultivation. Hence, conditions are most promising, and with an early rainy season in prospect we are looking forward to a maximum crop again. Fortunately, too, the diseases of the grubs in certain districts are still active, even though the pest has gone deep into the soil to hibernate and pupate. Furthermore, the Digger Wasps are everywhere in evidence in infested fields; so altogether there is hope for a material decrease in the grub pest.

“The Borer Beetle, too, is coming under control, for there is a marked decrease in their depredations in all of the areas where we have liberated the Tachinid parasites (*Ceromasia sphenophori* Vill.) bred at the station.

“The Linear Bugs, on the other hand, have never been so abundant in cane areas. They undoubtedly are coming more and more from the wild grasses, and they certainly are a serious drain upon the sugar-content.

NATURAL ENEMIES OF CANE GRUBS.

“*Digger Wasps*.—It is interesting to record that certain farmers have made use of the advice to plant pigeon peas near cane areas; wherever these occur they are swarming with bees and wasps, which feed upon the nectar. These plants, though rather late in flowering this season, were of considerable value in keeping the wasps in the vicinity of the grubby areas.

“It is well known that the females of these valuable insects are the workers, spending most of their time far beneath the soil in search of their prey. Hence, they only come out when hungry; and their usefulness is greatly increased if they can be supplied with nectar close at hand. In other words, if no flowers are available, the wasps go in search of them, and when fed are apt to seek the nearest grubs in the soil—in blady grass or other wild land, where there is no direct benefit to the canegrower.

“The male wasps, too, feed upon nectar, but they do not enter the soil. They fly about in great numbers just over the surface of grub-infested fields, waiting for the females to emerge from their strenuous duties. Fortunately, the so-called weaker sex is considerably larger among wasps than the indolent males; and, since she is the only one provided with a sting, she is able to lord it over the poor little fellow.

“*Diseases*.—Both the fungus and bacterial diseases continue active in the areas wherever we have discovered them. Unfortunately, these friendly organisms are not generally distributed, though they occur in widely separated localities.

“The bacterial disease is far less virulent than the fungus, under the same conditions. Nevertheless, they often go hand in hand, the grubs dying by a complication of ailments. Often the legs of the grub will become blackened, and one or more will fall off—unmistakable symptoms of the bacterial complaint; then the grub will quickly succumb to the fungus, his body becoming hard and cheesy, and, finally

turning green as the spores develop. These spores are exceedingly small; even when viewed with a magnification of 400 diameters they appear as tiny oval bodies, and hardly more than one-sixteenth of an inch in length. Ordinarily, unless broken apart, they are attached end to end, like a string of sausages, for these fruiting bodies are formed from the branching tubes of the Mycelium (the vegetative part of the mould). Wherever the Mycelium comes to the surface of the dead grub, it branches profusely, and each of the tips then becomes constricted into a line of numerous spores. Hence the numbers produced by a single grub are unthinkable—a tiny speck of this green powder taken on the point of a pin and placed under the microscope is a revelation, for the mass of spores is beyond counting. Therefore, it is easy to understand how the soil becomes thoroughly inoculated with this contagion as it is ploughed and cultivated. Furthermore, probably a single spore is sufficient to bring about the disease, when ingested with the soil by the grub, if the climatic conditions are right.

BEETLE BORERS AND THEIR PARASITES.

“This terrible pest, second in importance only to the white grubs in Queensland, destroys approximately one ton of sugar per acre, and, where the infestation is severe, considerably more. Furthermore, it is a pest that is rapidly spreading to new districts through the distribution of infested seed-cane. Then, too, where cane from infested districts is hauled long distances to mills, the grubby sticks are dropped along the line, sometimes a whole load spilling in one place. It is noticeable that the fields adjoining such railways have become infested during the past few years. This is particularly the case at Mourilyan, where the cane is sent over from the Goondi side of the river, and also at Hambleton, which brings part of its supply from far up the Babinda line. I have seen the latter cane come into the mill perfectly riddled with the borers, especially following the 1918 cyclone.

“It is very encouraging that the Tachinid parasites are becoming established, for there is a tremendous improvement already noticeable where the flies have been liberated. Undoubtedly the net increase in sugar, due to the checking of this single pest in the Cairns district alone, is sufficient to pay all expenses of our investigation for many years to come.

“I am continuing the breeding of the flies, liberating them in increasing numbers in the vicinity of Gordonvale, until such time as we find them established here.

LINEAR BUGS.

“This new pest (*Phaenacantha australica* Kirkaldy) is still in hoards in many fields, particularly those that are very grassy, and where the headlands are full of grass. Where these insects have been working extensively the leaves show a decided yellowing, many of them being dry and dead at the tips, the fields having an appearance similar to that caused by the leafhoppers in Hawaii before that pest was brought under control.

“It is an easy matter for these hoards of bugs, with their beaks all inserted in the under surface of the leaves, to reduce the sugar content fully a ton or more per acre. Unfortunately, we have not yet had an opportunity to make a careful estimate of this loss here; but it is enlightening to recall the serious depredations caused by leafhoppers in Hawaii, where the cane was so reduced in sugar content by these sucking insects that in many cases it hardly paid for milling. Furthermore, the report of the growers shows most remarkable results from the introduction of the minute egg parasites from the Cairns district. These tiny wasps, so small as to be scarcely visible to the naked eye, multiplied and spread so rapidly that soon after their introduction it was estimated that they saved the industry \$1,500,000 annually. It is interesting here to digress, for the same species of leafhopper is found throughout Queensland; and still most growers do not know that these tiny insects exist. They are everywhere present, but in such small numbers that they do no appreciable damage, since they are held completely in control by natural enemies.

“Unfortunately, the Linear Bugs are not so well controlled; and they work so insidiously that it is a difficult matter to get an exact estimation of the damage done by them. If they reduce the sugar a ton per acre in badly infested fields, and this is not improbable, the loss for the whole industry is tremendous. There is no better argument for clean cultivation, at least keeping the grass down within the cane paddocks and along the headlands. Furthermore, it will undoubtedly be found profitable to use fire for their destruction, as often as possible burning the surrounding grass lands, as well as the trash from the cane.”

General Notes.

SOCIETIES, SHOW DATES Etc.

MURGON.—Murgon Pastoral, Agricultural, and Horticultural Society. Secretary, T. M. Stephenson.

ERRATUM.

IMPORTS OF COFFEE.

In our issue of October last, owing to the accidental omission of punctuation, the imports of coffee, raw and kiln-dried, into Australia for the year 1917-18 was set down at 257,818 lb. The actual total was 2,605,247 lb., duty being paid on 2,482,480 lb.

HOW TO DESTROY ANTS.

The "South African Gardening and Country Life" for September gives the following simple but effective method of destroying ants in the garden:—

Ants are troublesome in many gardens just now. They have a strong dislike to moisture of any kind, and a very simple remedy is to pour boiling or even cold water from a coarse rose watering can on to their nests. These generally consist of a network of irregular tunnels lying either close to the ground surface or at some distance below it. Sometimes one finds a well organised colony underneath a large stone. All the nests that can be found should be treated in a similar manner and the application repeated in a day or two, when there are evidences of recolonisation. Hot water will kill thousands, and their haunts should be flooded now and again. One ounce of the commercial carbolic acid dissolved in five gallons of water applied as a spray to all places frequented by them is a good poison, and fresh ground lime soon causes them to move on to "fresh fields." If they infest the flower borders, a strong soil fumigant such as vaporite, or plenty of water, will prove effectual. Strong liquid insecticides are also useful to pour into the nests. A good sized bone from the soup pot with some meat attached proves an excellent bait, and can be washed, dried, and used over again.

Answers to Correspondents.

CEMENT FOR FLOOR.

To cement a floor 15 feet wide, 30 feet long, and 4 inches thick, 7 casks or 21 bags of cement will be required. If a topping of cement is required, use one part of sand, one part cement, and lay it to a thickness of $\frac{3}{4}$ inches; this will take 15 bags more.

CREAM AND BUTTER.

In reply to a correspondent asking for particulars as to the amount of commercial butter that is derived from a quantity of cream containing 40 per cent. of butter-fat, it is estimated that 1 lb. of cream containing that percentage of butter-fat (Babcock method) will produce .48 lb. of commercial butter, and 10 lb. of cream with a similar butter-fat content will produce 4.83 lb. of commercial butter.

SOUTHERN FRUIT MARKETS.

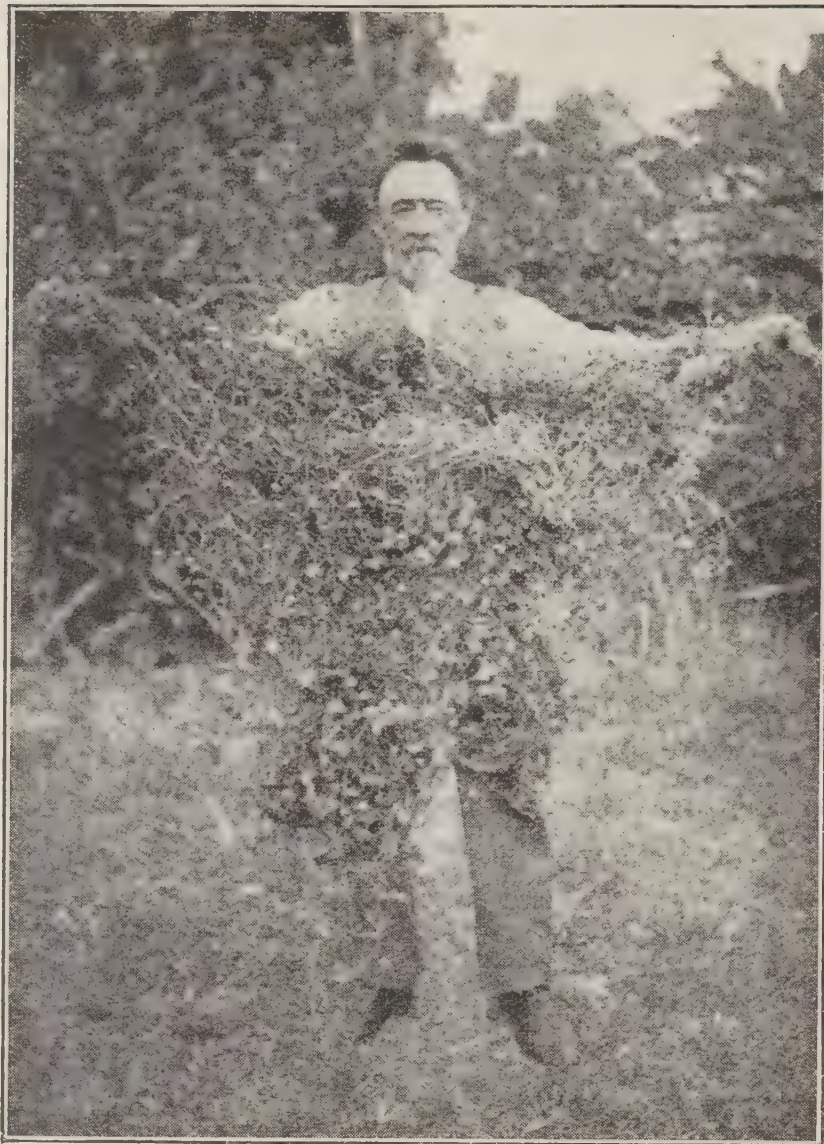
Article.	OCTOBER.	
	Prices.	
Bananas (Tweed River), per double case	17s. to 26s.	
Bananas (Queensland), per double case	25s. to 30s.	
Bananas (Fiji), per double case ... ..	...
Lemons, per bushel case	3s. to 5s.	
Mandarins, per case	20s.	
Oranges (common), per bushel case	9s.	
Oranges (Navel), per bushel case	15s. to 18s.	
Passion Fruit, per bushel case	10s. to 15s.	
Pineapples (Queens), per double case	20s. to 23s.	
Pineapples (Ripley), per double case	20s. to 22s.	
Pineapples (common), per double case	3s. to 8s.	
Tomatoes, per quarter case	10s. to 16s.	

PRICES OF FRUIT—TURBOT STREET MARKETS.

Apples, Eating, per bushel case	10s. to 16s.
Apples, Cooking, per bushel case	10s. 6d. to 14s. 6d.
Bananas (Cavendish), per dozen	4d. to 11d.
Bananas (Sugar), per dozen	5d. to 9d.
Citrons, per cwt.	16s.
Cocoanuts, per sack	£1 5s.
Cumquats, per quarter case	4s. to 5s. 6d.
Custard Apples, per case	3s. 6d. to 6s.
Gooseberries (Cape), per quart	10d. to 10½d.
Gooseberries, per quart	
Lemons (Lisbon), per quarter case	5s. to 7s. 6d.
Mandarins, per case	7s. to 18s.
Oranges (Seville), per cwt.	16s.
Oranges (Navel), per case	12s. to 15s.
Oranges (other), per case	6s. to 12s.
Papaw Apples, per case	5s. to 9s.
Passion Fruit, per half bushel case	10s. to 19s.
Peaches	
Pineapples (smooth), per dozen	5s. to 7s.
Pineapples (rough), per dozen	8s. 5d. to 10s. 6d.
Strawberries, per dozen boxes	6s. to 15s.
Strawberries, per tray	
Tomatoes, per quarter case	14s. to 17s.

TOP PRICES, ENOGGERA YARDS, SEPTEMBER, 1920.

Animal.	SEPTEMBER.	
	Prices.	
Bullocks	£22 15s. to £28	
Cows	£18 15s. to £19 5s.	
Merino Wethers	64s. 6d.	
Crossbred Wethers	59s.	
Merino Ewes	39s.	
Crossbred Ewes	49s. 6d.	
Lambs	43s.	
Pigs (Porkers)		



Subterranean Clover.

THIS wonderful Clover is the most nutritious herbage grown. It grows in dry sandy soil and gravelly pastures, and sows itself when once it gets a start. This can be claimed for no other Clover. Splendid for grazing, very fattening. Cattle may run or graze upon this *Trifolium* without harming it.

Subterranean Clover has no equal for the general purposes of excellent feed, pertinacity of reproduction, supply of humus, and charging the soil with nitrogen. It is more economical and effective in providing humus and nitrogen to the soil than any other plant known to the Scientific world. Land sown with it will annually produce a crop from its buried seed pods for many years.

Clean Seed, 7/6 lb. ; 7/- lb. in 14 lb. lots or more ;
6/6 lb. in 28 lb. lots or more.

LAW SOMNER
PTY. LTD.,

SEED AND PLANT MERCHANTS (Established 70 years)
139-141 SWANSTON STREET, MELBOURNE.

Farm and Garden Notes for December.

Too much care can scarcely be bestowed upon potatoes dug up this month to protect them from the sun. They should be dug or ploughed out as soon as the skin is firm, as they are liable to rot in the ground owing to the great heat.

FIELD.—The wheat harvest will be now nearing completion. The estimates of the probable yield have varied so considerably that it will be well to wait until the entire harvest is over before speculating on the result. This State is a long way from becoming a wheat-exporting country. The principal factor operating against a still greater extension of the wheatgrowing industry is that many farmers who formerly grew wheat and barley have turned their attention to dairying, which offers larger and quicker returns.

Given favourable weather, maize, panicum, imphee, kafir corn, and the various millets may be sown.

Cotton sown in October and November will be making headway but slowly, owing to the lack of September and October rains. Keep down all weed growth by scarifying as long as the growth will admit of horse work. Tree cottons, such as Sea Island and Caravonica, should be topped and pruned. In tropical Queensland, cotton may still be sown.

KITCHEN GARDEN.—Gather cucumbers, melons, vegetable marrows, and French beans as soon as they are fit for use. Even if they are not required, still they should be gathered, otherwise the plants will leave off bearing. Seeds of all these may be sown for a succession. Sow cabbage and cauliflower seed. Great difficulty will be experienced in getting these to grow at this season, and the plants will consequently be more valuable in proportion. Tomatoes should be in full bearing, and the plants should be securely trained on trellises or stakes. Take up onions, and spread them out thinly on the barn floor until the tops wither sufficiently to pull off easily. They should then be graded into sizes, and sent to market or stored in a cool place. Where there is an unlimited supply of water, and where shade can be provided, lettuce and other salad plants may still be sown. All vacant ground should be well manured and dug two spits deep. Manure and dig as the crops come off, and the land will be ready for use after the first shower.

FLOWER GARDEN.—Keep the surface of the land well stirred. Do not always stir to the same depth, otherwise you are liable to form a "hard pan," or caked surface, beneath the loose soil. Alternate light with deep hoeings. A few annuals may still be planted, such as balsams, calendulas, cosmos, coreopsis, marigold, nasturtium, portulaca, zinnia, and cockscomb. Plant out whatever amaranthus may be ready. These may still be sown in boxes. Clear away all annuals which have done flowering. Bulbs should have all the dead leaves cut away, but the green leaves should not be touched. Stake chrysanthemums, and, as the flower buds develop, give them weak liquid manure. Coleus may now be planted and propagated from cuttings. Dahlias are in various stages, but the greater part will have been planted by this time. Give them liquid manure, and never let them dry up. Lift narcissus about the end of the year, but do not store them. Plant them out at once in their new positions. Top-dress all lawns.

Orchard Notes for December.

THE SOUTHERN COAST DISTRICTS.

December is somewhat an off month for pines, though bananas should be improving both in quality and quantity. The purely tropical summer ripening fruits are not yet ready, and, consequently, there is only a limited supply of fruit in this part of Queensland during the month.

Early ripening varieties of grapes will mature, and care should be taken to market them in good order. The first fruit to ripen should be put up in small packages, as, if marketed in this manner, it will fetch a better price, but as it becomes more plentiful it can be packed in larger cases.

Pay particular attention during the month to all peaches, apples, pears, Japanese plums, or other fruits that are liable to be attacked by fruit fly, and see that no fly-infested fruits are allowed to lie about the trees, and thus breed out a great crop of flies that will be ready to destroy the grape and mango crops as they mature.

If the month is dry, see that the orchard is kept well worked so as to retain moisture in the soil, and, in any case, even should there be a good rainfall, it is necessary to cultivate in order to keep down weed growth, as if weeds are not kept in check now there is little chance of their being kept in hand once the January and February rains set in.

The planting out of pineapples, bananas, and most kinds of tropical fruits can be carried out during the month, especially if there is any rainy weather; but, if the weather is dry, it is better to defer the planting out of tropical fruits till January or February.

The cyaniding of citrus trees can be continued when necessary, and where Maori or orange mite is showing it should be checked at once, as Maori fruit is of no use for the Southern markets, and is unsuitable for export to the old country.

THE TROPICAL COAST DISTRICTS.

Clean up all orchards and pineapple and banana plantations as long as you have the chance of fine weather, so as to have your land in good order when the wet season commences, as once the rain sets in there is little chance of fighting weeds. Watch bananas carefully for fly, and market the fruit in good order. Handle the crop of pines carefully; don't let the fruit get too ripe, as an over-ripe Northern pine is tasteless. The fruit should be cut as soon as it is fully grown, as even when quite green the rough-leaf varieties have usually developed sufficient sugar to suit most persons' taste. Pack carefully to prevent bruising, and they will carry South in good order.

Only send high-class mangoes South—bad-flavoured sorts, and stringy, carrotty, or turpentine flavoured varieties are not worth shipping. High-class fruit will pay to handle carefully, but there is no demand for rubbish, and I am sorry to say that fully 90 per cent. of the mangoes grown in the State must be classed under the latter heading.

Tropical fruits of all kinds can be set out during suitable weather. Fruit pests of all sorts must be systematically fought.

THE SOUTHERN AND CENTRAL TABLELANDS.

December is a busy month for the growers in the Stanthorpe district. Early apples, plums, peaches, nectarines, &c., will ripen during the month, and must be marketed as soon as ripe, as they do not keep long once they are gathered. Handle carefully, and grade better; there is far too much early rubbish dumped on to the local markets, which tends to spoil the demand as well as the price. Watch the orchards very carefully for codling moth and fruit fly, and take every possible precaution to keep these pests in check should they make their appearance, as the future cleanliness of the orchard depends very largely on the care that is taken now to keep these pests in check.

If the month is dry, keep the orchard and vineyard well cultivated. Watch the vines carefully so as to detect the first signs of Oidium or Anthraenose, and systematically fight these pests, remembering always that in their case prevention is better than cure, and that only prompt action is of the slightest value.

On the Darling Downs every care must be taken to keep the fruit-fly in check, and on no account must infested fruit be allowed to lie about under the trees, as this is far and away the best method of propagating the pest wholesale.

In the Central District the grape crop will ripen during the month. Handle the fruit carefully. Cut it when dry, and where it has to be sent long distances to market pack in 6-lb. baskets rather than in larger cases. Where dry keep the orchard and vineyard well cultivated, and where the citrus and other fruit trees require it give them an irrigation. Don't irrigate grapes once the seeds have been formed, as it tends to deteriorate the quality, and to make the fruit tender and consequently to carry badly.

SEED TESTING.

Samples of any seeds purchased or offered for sale as seeds for sowing may be sent to the Department of Agriculture and Stock for analysis.

WEIGHT OF SAMPLE TO MAIL.

Wheat, Oats, Barley, Maize, Rice, Rye, Peas, Cowpeas, Beans, Tares	8 oz.
Millet, Sorghum, Sudan Grass, Panicum, Buckwheat, Lucerne, Clover, Linseed	4 oz.
Rhodes, Paspalum	2 oz.
Turnip, Cabbage, Parsnip, Carrot, and Vegetable Seeds of like size	$\frac{1}{2}$ oz.
All Seeds other than those included above	2 oz.
Vegetable Seeds in made-up packets	3 packets

When drawing a sample be careful to obtain a quantity from the top, bottom, and middle of each bag. These should be thoroughly mixed to ensure the sample being uniform.

The name of the seed, with name and full address of the sender, should be on every sample.

If the result of the test is required for purposes of sale, a fee of 2s. 6d. per sample will be charged.

No charge will be made to Farmers sending in samples of the seed that they have purchased as seed for sowing, providing the following particulars are given:—

Vendor's name and address.

Name of seed.

Quantity purchased.

Date of delivery.

Locality where seed is to be sown.

Name and address of purchaser.

Samples, with covering letter, should be addressed to—

UNDER SECRETARY,

DEPARTMENT OF AGRICULTURE AND STOCK,
BRISBANE.

ASTRONOMICAL DATA FOR QUEENSLAND.

TIMES COMPUTED BY D. EGLINTON, F.R.A.S.

TIMES OF SUNRISE AND SUNSET.
AT BRISBANE.

1920.	SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		PHASES OF THE MOON, ECLIPSES, &c.
Date.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.	
1	6.1	5.35	5.29	5.47	4.59	6.5	4.46	6.28	(The times stated are for Queensland New South Wales, and Victoria).
2	6.0	5.35	5.28	5.48	4.58	6.6	4.46	6.29	
3	5.59	5.36	5.27	5.49	4.57	6.6	4.46	6.30	H. M.
4	5.58	5.36	5.26	5.49	4.57	6.7	4.46	6.31	6 Sept.) Last Quarter 5 5 a.m.
5	5.57	5.37	5.24	5.50	4.56	6.8	4.46	6.32	12 „ ☉ New Moon 10 52 p.m.
6	5.56	5.37	5.23	5.50	4.55	6.9	4.46	6.33	20 „ ☾ First Quarter 2 55 p.m.
7	5.55	5.37	5.22	5.50	4.55	6.9	4.46	6.33	28 „ ○ Full Moon 11 57 a.m.
8	5.54	5.37	5.21	5.51	4.54	6.10	4.47	6.34	Perigee on 9th at 8.12 a.m. Apogee on 21st at 8.42 a.m.
9	5.53	5.38	5.20	5.51	4.53	6.10	4.47	6.34	5 Oct.) Last Quarter 10 54 a.m.
10	5.52	5.38	5.19	5.51	4.52	6.11	4.47	6.35	12 „ ☉ New Moon 10 50 a.m.
11	5.50	5.38	5.17	5.52	4.52	6.12	4.47	6.35	20 „ ☾ First Quarter 10 30 a.m.
12	5.49	5.39	5.16	5.52	4.51	6.13	4.48	6.33	28 „ ○ Full Moon 12 9 a.m.
13	5.48	5.39	5.15	5.53	4.51	6.14	4.48	6.36	Perigee on 4th at 7.54 p.m. and 31st at 12.26 a.m. Apogee on 19th at 4.42 a.m.
14	5.47	5.40	5.14	5.54	4.50	6.15	4.48	6.37	A Total Eclipse of the Moon will occur on the night of the 27th, commencing about 11.30. An hour earlier it will be entering the dark shadow of the earth.
15	5.46	5.40	5.13	5.55	4.50	6.16	4.49	6.37	
16	5.45	5.41	5.12	5.55	4.49	6.17	4.49	6.38	
17	5.44	5.41	5.11	5.56	4.49	6.18	4.49	6.38	3 Nov.) Last Quarter 5 35 p.m.
18	5.43	5.42	5.10	5.56	4.48	6.18	4.50	6.39	11 „ ☉ New Moon 2 5 a.m.
19	5.42	5.42	5.9	5.57	4.48	6.19	4.50	6.39	19 „ ☾ First Quarter 6 13 a.m.
20	5.41	5.43	5.8	5.58	4.48	6.20	4.50	6.40	26 „ ○ Full Moon 11 42 a.m.
21	5.40	5.43	5.7	5.59	4.48	6.21	4.51	6.40	Apogee on 16th at 12.18 a.m. Perigee on 27th at midnight. The Moon will cause a partial eclipse of the Sun during the night of the 10th, visible only on the other side of the world, including Great Britain and Ireland.
22	5.39	5.43	5.6	5.59	4.48	6.21	4.51	6.41	
23	5.38	5.44	5.5	6.0	4.48	6.22	4.52	6.41	
24	5.37	5.44	5.4	6.0	4.47	6.22	4.52	6.42	
25	5.36	5.44	5.4	6.1	4.47	6.23	4.53	6.43	3 Dec.) Last Quarter 2 29 a.m.
26	5.34	5.45	5.3	6.1	4.47	6.24	4.53	6.43	10 „ ☉ New Moon 8 4 p.m.
27	5.33	5.45	5.2	6.2	4.47	6.24	4.54	6.44	19 „ ☾ First Quarter 12 40 a.m.
28	5.32	5.45	5.1	6.2	4.47	6.25	4.54	6.44	25 „ ○ Full Moon 10 39 p.m.
29	5.31	5.46	5.0	6.3	4.47	6.26	4.55	6.45	Apogee on 13th at 3.30 p.m. Perigee on 26th at 10.24 a.m.
30	5.30	5.46	5.0	6.3	4.47	6.27	4.56	6.45	
31	...	...	4.59	6.4	...	...	4.57	6.45	

For places west of Brisbane, but nearly on the same parallel of latitude—27½ degrees S. —add 4 minutes for each degree of longitude. For example, at Toowoomba the sun would rise about 4 minutes later than at Brisbane if it were not for its higher elevation, and at Oontoo (longitude 141 degrees E.) about 48 minutes later.

At St. George, Cunnamulla, and Thargomindah the times of sunrise and sunset will be about 18 m., 30 m., and 38 minutes respectively, later than at Brisbane.

At Roma the times of sunrise and sunset may be roughly arrived at by adding 16 minutes to those given for Brisbane, but an allowance of 3 or 4 minutes more is sometimes necessary.

The moonlight nights for each month can best be ascertained by noticing the dates when the moon will be in the first quarter and when full. In the latter case the moon will rise somewhat about the time the sun sets, and the moonlight then extends all through the night; when at the first quarter the moon rises somewhere about six hours before the sun sets, and it is moonlight only till about midnight. After full moon it will be later each evening before it rises, and when in the last quarter it will not generally rise till after midnight.

It must be remembered that the times referred to are only roughly approximate, as the relative positions of the sun and moon vary considerably.

[All the particulars on this page were computed for this Journal, and should not be reproduced without acknowledgment.]

IRRIGATED EDUCATION

A College Education has become necessary to secure any worth while position.

In CITY OFFICES positions are available for those who can do the work. The preparation includes Shorthand, Typewriting, Bookkeeping, Business Practice, Filing and Card Systems. Wages are high for those who are qualified.

In WAREHOUSES, shop assistants are in demand. Men are getting from £5 per week to considerably larger sums according to their training and consequent ability. Tailoring and Tailor Cutting are first-class occupations. Numerous other courses are in operation for various vocations.

FOR SKILLED LABOUR. The demand upon us is more than we can supply. No matter how many students we train still there is a shortage. Two students have just gone out at £6 and £8 respectively.

YOU CAN BE TRAINED to take your place equally with others, by correspondence. There is no need to live in the city. Write to Bradshaw's and state what you would like to do, what you now are, and what education you have had. They will advise you, send you particulars of the courses they suggest, teach you by post, and recommend you for a position at more than ordinary wages.

Get these thoughts running through your mind
and channel direct to the Reservoir of
BUSINESS EFFICIENCY

WRITE TO-DAY for full details and Pamphlet P32

BRADSHAW'S BUSINESS
COLLEGE
PTY., LTD.

240-50 FLINDERS STREET, MELBOURNE, VIC.

RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF SEPTEMBER IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALLS DURING SEPTEMBER, 1920 AND 1919, FOR COMPARISON.

Divisions and Stations.	AVERAGE RAINFALL.		TOTAL RAINFALL.		Divisions and Stations.	AVERAGE RAINFALL.		TOTAL RAINFALL.	
	Sept.	No. of Years' Records.	Sept., 1920.	Sept., 1919.		Sept.	No. of Years' Records.	Sept., 1920.	Sept., 1919.
<i>North Coast.</i>					<i>South Coast—continued:</i>				
	In.		In.	In.		In.		In.	In.
Atherton	0·60	19	0·21	0·83	Nambour	2·48	24	2·57	0·15
Cairns	1·69	38	1·03	1·56	Nanango	1·95	38	2·47	0·29
Cardwell	1·43	48	2·52	1·03	Rockhampton ...	1·33	33	0·66	0·03
Cocktown	0·57	44	0·91	0·47	Woodford	2·14	33	2·48	0·18
Herberton	0·48	33	0·23	0·92					
Ingham	1·06	28	2·99	0·95					
Innisfail	3·04	39	2·49	2·86					
Mossman	1·08	12	2·04	2·01					
Townsville	0·76	49	1·89	0·11					
<i>Central Coast.</i>					<i>Darling Downs.</i>				
Ayr	1·59	33	0·91	0·05	Dalby	1·79	50	2·34	0·15
Bowen	0·83	49	1·07	0·03	Emu Vale	1·90	24	2·06	0·12
Charters Towers ...	0·80	38	0·66	0·04	Jimbour	1·65	32	1·65	Nil
Mackay	1·49	49	1·20	0·18	Miles	1·46	35	2·67	0·03
Proserpine	1·95	17	2·93	0·12	Stanthorpe	2·46	47	2·99	0·18
St. Lawrence	1·33	49	0·93	0·07	Toowoomba	2·24	48	2·40	0·41
					Warwick	1·91	33	2·29	0·16
<i>South Coast.</i>					<i>Maranoa.</i>				
Biggenden	1·68	21	0·02	2·61	Roma	1·58	46	2·64	Nil
Bundaberg	1·84	37	1·94	Nil					
Brisbane	2·08	69	3·43	0·19					
Childers	1·98	25	3·21	Nil					
Crohamhurst	2·53	25	3·71	0·33					
Esk	2·32	33	3·24	0·23					
Gayndah	1·58	49	2·67	0·06					
Gympie	2·15	50	2·82	0·05					
Glasshouse M'tains	2·02	12	2·77	0·15					
Kilkivan	1·73	41	1·86	Nil					
Maryborough	1·97	49	2·52	Nil					
					<i>State Farms, &c.</i>				
					Bungeworgorai ...	1·55	6	1·75	Nil
					Gatton College ...	1·72	21	2·54	0·12
					Gindie	0·88	21	1·32	Nil
					Hermitage	1·62	14	2·51	0·12
					Kairi	0·88	6	0·24	0·91
					Sugar Experiment				
					Station, Mackay	1·33	23	1·20	0·08
					Warren	0·81	6	0·40	Nil

NOTE.—The averages have been compiled from official data during the periods indicated; but the totals for September this year, and for the same period of 1919, having been compiled from telegraphic reports, are subject to revision.

GEORGE G. BOND, State Meteorologist.

23
Q
Queensland.

Department of Agriculture and Stock.

Volume XIV.



DECEMBER, 1920.

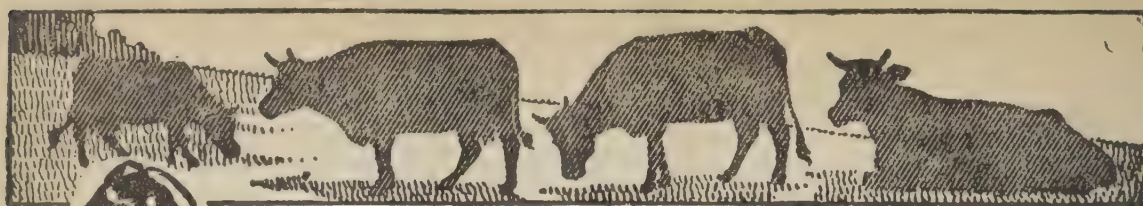
Queensland Agricultural Journal.



REGISTERED AT THE GENERAL POST OFFICE, BRISBANE,
FOR TRANSMISSION BY POST AS A NEWSPAPER.

Edited by
A. J. BOYD, F.R.G.S.Q.

Protect Your Dairy Profits!



No Farmer can afford to be without
a Good Cream Separator!

Buy the "**DIABOLO**" and not only save the
first cost, but save time and labour in operating.

Do your skimming faster and better.

CHOOSE THE SEPARATOR WITH THE
BIGGEST REPUTATION IN THE WORLD—
THE "**DIABOLO**"—IT IS A PROVED
PROFIT MAKER FOR THE FARMER.

ONE MONTH'S FREE TRIAL!

Communicate with us right away,

DIABOLO
CREAM SEPARATOR CO.
158-160 CREEK ST BRISBANE

Intending Maize Planters

We have just the line **You** require. Our New Stock of **Seed Maize** has arrived, and includes Yellow Moruya, Yellow Dent, Flat Red, Red Nib, 90-Day, Silvermine, Hickory King, &c. The variety which suits your soil **MUST** be in this list. If you have not already bought, don't wait any longer now we have had good rains. **Write to Taylors.**

SUDAN GRASS.

Sudan is one of the most splendid grasses we know of, and is very highly spoken of by those who have tried it. Its drought-resisting qualities are wonderful; it is a prolific yielder, and nutritious feed for cattle, sheep, &c. You simply cannot go wrong if you try a plot. We are always pleased to supply quotations or information.

We might also mention our stocks of Imphee, Panicum, Japanese Millet, Rhodes Grass, Paspalum, Couch Grass, Saccaline, &c. All these are of good germinating quality. **Can we quote you?**

Vegetable and Flower Seeds
of every description in packets from 3d. each upwards and in bulk.

CHAS. TAYLOR & Co.,

"THE LEADING SEEDSMEN,"

110-116 Roma Street - - - BRISBANE.

Registered at the General Post Office for Transmission by Post as a Newspaper.]



THE
QUEENSLAND AGRICULTURAL JOURNAL,

ISSUED BY DIRECTION OF

THE HON. THE SECRETARY FOR AGRICULTURE.

EDITED BY A. J. BOYD F.R.G.S.Q.

VOL. XIV. PART 6.

DECEMBER.

By Authority:

ANTHONY JAMES CUMMING, GOVERNMENT PRINTER, BRISBANE.

1920.

We are Bag Specialists

For Farmers For Farmers For Farmers

Bags for Wheat, Maize, Chaff, Peas, Beans, etc.
Any sort or kind. New or Second Hand.

**For Storekeepers, Meat Exporters, Flour
———Millers, Bacon Curers, etc.———**

All kinds of HESSIAN and CALICO BAGS
———Printed to your own design.———

For Packing, Signwriting, Plastering, etc.
HESSIAN & CALICO all widths & grades.

Joyce Bros. (Q.) Limited,
Stanley Street, South Brisbane.

IMPHEE.—A quick-growing crop which will, when mature, stand in the paddock until it is wanted.

BLACK SORGHUM.—One of the most popular of the sorghum family.

PANICUM.—A quick-growing fodder that is in popular favour.

WHITE PANICUM.—Another quick-growing fodder that is very popular.

PASPALUM.—We have good stocks of clean seed. Price on application.

RHODES GRASS.—Like Paspalum, Rhodes Grass is one of the most famous of our introduced grasses. Price on application.

SUDAN GRASS.—Gives excellent results even in very dry districts. Produces great crops of succulent fodder, and is grand for hay.

JAP MILLET.—A wonderfully quick grower, which gives an abundance of feed within 6 to 10 weeks of planting, provided the season is favourable.

Prices on application.

H. A. PETERSEN, LTD.

Seedsman and Nurseryman

George Street

Brisbane

CONTENTS.

AGRICULTURE—	PAGE.	BOTANY—	PAGE.
The Cotton-growing Industry in Queensland	257	On Two Species of Kurrajong (<i>Brachychiton</i>) Occurring in Queensland (C. T. White) ...	289
THE DWARF COCONUT	258	Inquiry <i>re</i> Suitability of Black Bean Seeds for Stock Food ...	293
PASTORAL—		The Prickly Poppy	293
Breeders of Purebred Stock in Queensland—Beef and Dairy Cattle	259	APICULTURE—	
Record Lambing	261	The Causes of the Periodical Retrogression of the Beekeeping Industry in Australia	294
Some Champion American Dairy Cows	261	ERADICATION OF SORREL	295
SISAL HEMP	261	RAINFALL IN THE AGRICULTURAL DISTRICTS ...	296
THE HORSE—		PLANT PATHOLOGY—	
Bitting and Breaking Horses ...	262	The Root Disease of the Banana in North Queensland (J. F. Illingworth)	297
DAIRYING—		THE WORLD'S WHEAT: A FORECAST ...	301
Do We Overfeed Milk	263	ENTOMOLOGY—	
Dehorning Cows	264	Cane Grub Investigation	302
Milch Goats (W. C. Carmody) ...	265	HELPING THE HOSPITALS	304
Specifications for Laying the Floor of Cowbails with Portland Cement Concrete	267	GENERAL NOTES—	
A WONDERFUL INSTRUMENT	267	Silver Wattle Gum	305
POULTRY—		How the Blind Can Read	306
Report on Egg-laying Competition, Queensland Agricultural College, October, 1920	268	How Forestry Increases the Farm Income	306
The Fowl Tick	270	Flax-growing	307
Final Report of the Sixteenth Egg-laying Competition, Queensland Agricultural College, Part 3 ...	272	Pig-fattening Experiments with Dried Blood	307
A Family's Experience in Poultry Farming	276	Cost of Sugar-growing and Sugar Manufacture in 1892 and 1920 ...	308
About Muscovy Ducklings (R. T. G. Carey)	276	The American Cotton Situation ...	308
LOSS BETWEEN CUTTING AND MILLING CANE	277	ANSWERS TO CORRESPONDENTS—	
THE ORCHARD—		The Use of Bluestone on Blown Sheep	309
Taking Water Out of Fruit ...	278	THE MARKETS—	
WHEAT PRICE FIXED	278	Prices of Farm Produce in the Brisbane Markets for November, 1920	310
TROPICAL INDUSTRIES—		Vegetables—Turbot Street Markets ...	310
Premature Arrowing of Sugar-cane (G. A. Labarthe)	279	Southern Fruit Markets	311
Coffee Growing in Queensland, No. 1 (T. A. Bromiley)	280	Prices of Fruit—Turbot Street Markets	311
The Central Sugar Districts ...	281	Top Prices, Enoggera Yards, October, 1920	311
Report on Canefields in the Central Districts	283	ORCHARD NOTES FOR JANUARY	312
The Early Sugar Mills	285	FARM AND GARDEN NOTES FOR JANUARY ...	313
		SEED TESTING	315
		ASTRONOMICAL DATA FOR QUEENSLAND ...	316
		DEPARTMENTAL ANNOUNCEMENTS... ..	xv.

Gindie State Farm.

Beef Shorthorn Stud.

All sires in use are pedigreed and entered in the Queensland Shorthorn Herd Book.

Young Stud and Herd Bulls for sale. Bred in ticky country. Inspection invited.

**Apply to Manager,
Gindie, Emerald-Springsure Line.**



The **Santwill**
WORK SHIRT

*Sand in Colour
Twill in Quality*

For Men of Action —Give Satisfaction

"SANTWILL" is a new Work Shirt, light-medium weight, and sand coloured. A new colour that will not show the dust, in a cotton quality that will outwear two of most other shirts.

"SANTWILL" Shirts let muscles play in every way. Work wonders for wonder workers. You'll like their honest broad-shoulder comfort, cut full, not "skimped." "Rip-proof"—"Dirt-proof"—"Non-gaping." Buttons sewed on to stay. The toughest working shirt made. Manufactured from the well-known first grade Shirley weave on the world famous Manchester looms. Also in plain white—same price—for lounge or sporting wear.

9/6 each 3 for 27/-

Pike Brothers
Limited

QUEENSLAND AGRICULTURAL JOURNAL

VOL. XIV.

DECEMBER, 1920.

PART 6.

Agriculture.

THE COTTON-GROWING INDUSTRY IN QUEENSLAND.

Now that cotton-growing by farmers in many parts of the State has, owing to the facilities afforded to them by the Government for the profitable sale of the product, begun to assume the importance which characterised the industry in past years, a few notes on the subject of conditions under which the crop can be produced in this State will doubtless be appreciated by intending growers. Those conditions are—An equable climate, not subject to sudden variations of temperature; a warm climate; and, in the case of Sea Island cotton, a moist, saline atmosphere such as is found on the Sea Islands of James, Edisto, Wadmalow, and John's, off the coast of South Carolina, U.S.A. The coast lands of Queensland, north of Rockhampton, with their tropical heat, with a considerable rainfall, and with a saline atmosphere, are therefore admirably adapted to the cultivation of this particular variety of long-stapled cotton. There, the temperature of air and soil are practically in accord and remain equable during the whole growing season.

On the other hand, the Uplands and Egyptian varieties of the plant find a congenial atmosphere in the southern and western districts of the State.

By many people it is believed that the cotton plant is a drought-resister, which will survive even protracted drought. We have certainly seen fine cotton plants in the western districts, 500 miles from the coast, which had grown luxuriantly throughout the protracted drought which terminated in 1902. For two or three years these plants had been unacquainted with visible water in any form but occasional dew; but it does not follow from this that cotton can be generally successfully produced in an arid wilderness. Long-continued dry weather unquestionably has an injurious effect on the crop, in that it checks the production and growth of the bolls, and is the cause of the fibre being too short to be of great value. On the other hand, should there be too much rain, the plants may run to wood, to the detriment of the fruit. A certain amount of rain or other moisture is required before the blossoming period. After the bolls have formed, dry, warm weather is needed, more especially when the bolls have burst. The effect of long exposure to rain after they have opened out, on the exposed cotton, is not injurious. We have seen cotton which had been for many days drenched with rain, but yet underwent no change in colour or lustre. As regards soil conditions, a cotton soil need not be of the richest description, but neither may it be deficient in the special plant food needed for this crop. Some of our richest soils, which now produce heavy crops of maize, sugar-cane, and potatoes,

yielded very indifferent cotton crops, whilst poorer soils, under exactly the same conditions, gave handsome returns amounting, in some cases, to over 2,000 lb. of seed cotton per acre. In choosing a soil for the purpose of cotton-growing, a sandy loam, not too rich in humus, should, as a rule, be preferred to a heavy rich, black soil; and heavy clay soils should be avoided, as they are more difficult and expensive to work (and cannot be worked at all during continuous rainy weather), and hold water to such an extent that growth is practically stopped. Such lands require an admixture of large quantities of lime and sand. Stagnant water is one of the worst enemies of the cotton plant. What is required to ensure a good crop is a free soil with good drainage, enabling the plants to obtain all the moisture they need, whilst, at the same time, the superfluous water drains away.

The cotton plant sends a long taproot into the ground, and it is this that enables it to thrive during continued dry weather, the taproot going deep down (from 16 to 24 in.) in search of the needed moisture.

In the West Moreton district, where more cotton has been grown in the past than in any other part of the State, the generality of the soils are eminently suitable for a cotton crop, and the same may be said of the light sandy loams of the central and western districts.

THE DWARF COCONUT.

The following note, extracted from an article on "The Dwarf Coconut" by Mr. W. P. Handover in the "Agricultural Bulletin of the Federated Malay States," No. 5, 1919, will doubtless be interesting to those of our readers in Papua, Queensland, and other British coconut-growing dependencies. In reference to this topic we recall that in 1885, a most exhaustive history of the Coconut Palm was published by the proprietors of the "Ceylon Observer," and issued under the title "All About the Coconut Palm." In this book, many varieties of the palm are mentioned, but the Dwarf Palm mentioned therein, is described as bearing a sort of Maldivian or dwarf coconut, about the size of a duck's egg. However, that may be, the article alluded to reads as follows:—

"The dwarf coconut, known in this country as 'nyiur gading,' is remarkable for its early fruiting, palms only 10 ft. high bearing abundant fruits touching the ground. The young palm grown under good conditions starts to flower in its third year and produces ripe fruit in about nine months from the appearance of the flower spike. The initial flower spikes contain only male flowers, but other spikes appearing in rapid succession are larger and bear an increasing number of female flowers also, a spike from a six-year-old tree being counted with 200 young female flowers, whilst trusses of fruit from similar trees have been found with as many as fifty-five ripe nuts. It is generally of a bright yellow colour, and Winstedt, in his quotations from Malayan Folk Lore, speaks of 'nyiur gading,' the golden coconut only to be found in the Princes' Gardens.

"Five hundred nuts to a picul (133½ lb.) of copra is a general average yield. With the leaf length only 12 ft. it was found convenient to plant the palms 24 ft. by 20 ft., which gave ninety to the acre, a number nearly double to that required when planting big palms. In the fifth year the trees yielded thirty nuts apiece, so that 2,700 nuts would be obtained from trees planted ninety to the acre, while in the ninth year, which is the sixth yielding year, 120 nuts were yielded per tree in full bearing, making 10,800 nuts per acre or 21½ piculs (2,807 lb.) of copra per acre. The big coconut does not produce till after its fifth year, but in the ninth year forty-five trees per acre would probably yield forty nuts apiece or 1,800 nuts per acre, giving 8 piculs of copra per acre. The nuts of the dwarf trees can be easily and rapidly picked and also inspected for beetles and other pests. Almost two and a-half times the number of nuts per picul of copra have to be handled as compared with the larger nuts, but it is suggested that this may not be of great consequence when working with newly devised methods and machinery, dealing with large quantities."

[A good coconut tree should yield an average of 100 nuts per year, and in good seasons, 200 nuts have been obtained, but the average in some of the West Indian Islands is about 65 nuts per tree. Coconut Palms will continue to bear for seventy or eighty years. The low average is due, doubtless, to want of care and attention on the part of the planter. In 1908, the average return per tree in Papua was given by Mr. N. R. Schroder, in an article contributed to "Dalgety's Review," at the low estimate of 60 nuts per tree, and during the first six years, little or no returns were to be expected.—Ed. Q.A.J.]

Pastoral.

BREEDERS OF PUREBRED STOCK IN QUEENSLAND—BEEF AND DAIRY CATTLE.

The Office of the Secretary of the undermentioned Herd Book Societies is 303 Queen street, Brisbane:—

The Australian Hereford Herd Book;
 The Shorthorn Herd Book of Queensland;
 The Jersey Herd Book of Queensland;
 The Illawarra Herd Book of Queensland;
 The Ayrshire Herd Book of Queensland;
 The Milking Shorthorn Herd Book of Queensland;
 The Holstein-Friesian Herd Book of Australia.

NOTE.—Animals registered in the Commonwealth Standard Herd Book are not necessarily eligible for entry in the Jersey Herd Book of Queensland.

Name of Owner.	Address.	Number of Males.	Number of Females.	Herd Book.
DAIRY BREEDS.				
AYRSHIRES.				
W. C. Smith	The Haven, Goomeri	1	7	Ayrshire Society of Queensland
L. H. Paten	"Jeyendel," Calvert, S. & W. Line	8	21	Ayrshire Herd Book of Queensland
J. H. Paten	Gwandalan, Yandina	6	21	Do.
Queensland Agricultural College	Gatton	4	40	Do.
State Farm	Warren	3	83	Do.
J. W. Paten	Ayrshire Park, Wanora, Ipswich	10	42	Do.
J. H. Fairfax	Marinya, Cambooya	9	55	Do.
J. Holmes	"Longlands," Pittsworth	6	20	Do.
H. M. Hart	Glen Heath, Yalangur	7	21	Do.
F. A. Stimpson ..	Ayrshire Stud, Fairfield, South Brisbane	7	77	Do.
M. L. Cochrane ..	Paringa Farm, near Cairns	5	21	Do.
John Anderson ..	"Fairview," Southbrook	7	34	Do.
JERSEYS.				
T. Mullen	"Norwood," Chelmer	3	20	Jersey Herd Book of Queensland
Queensland Agricultural College	Gatton	2	31	Do.
M. W. Doyle	"Oaklands," Moggill	4	12	Do.
G. A. Buss	Bundaberg	1	15	Do.
R. Conochie	Brooklands, Tingoorra	9	21	Do.
W. J. Barnes	Millstream Jersey Herd, Cedar Grove	10	37	Do.
W. J. Affleck	Grasmere, N. Pine ..	6	31	Do.
J. N. Waugh and Son	Prairie Lawn, Nobby	3	28	Do.
W. J. H. Austin ..	Hadleigh Jersey Herd, Boonah	2	11	Do.
State Farm, Kairi ..	Kairi, <i>via</i> Cairns ..	4	16	Do.
H. D. B. Cox	Sydney (entered in brother's name)	3	16	Commonwealth Standard Jersey Herd Book
GUERNSEYS.				
Queensland Agricultural College	Gatton	2	2	Eligible, but no branch of the Guernsey Herd Book Society of Australia in Queensland

BREEDERS OF PUREBRED STOCK IN QUEENSLAND—*continued.*

Name of Owner.	Address.	Number of Males.	Number of Females.	Herd Book.
DAIRY BREEDS— <i>continued.</i>				
HOLSTEINS.				
Queensland Agricultural College	Gatton	2	9	Holstein-Friesian Herd Book of Australia
George Newman ..	"St. Athan," Wyreema	9	92	Do.
F. G. C. Gratton ..	"Fowlerton," Kings-thorpe	1	15	Do.
R. S. Alexander ..	Glenlomond Farm, Coolumboola	1	3	Do.
Ditto	Ditto	1	..	Holstein-Friesian Herd Book of New Zealand
S. H. Hoskings ..	St. Gwithian, Toogooloowah	..	..	Holstein-Friesian Herd Book of Australia
C. Behrendorff ..	Inavale Stud Farm, Bunjgurgan, Q.	3	9	Do.
E. Swayne	West Plane Creek, Mackay	1	2	Do.
ILLAWARRA.				
A. Pickels	Blacklands Stud, Wondai	4	62	Illawarra Herd Book of Queensland
J. T. Perrett and Son	Corndale, Coolabunia	3	43	Do.
W. T. Savage	Ramsay	2	22	Do.
Hunt Bros.	Springdale, Maleny ..	3	62	Do.
MILKING SHORTHORNS.				
P. Young	Talgai West, Ellinthorp	2	42	Milking Shorthorn Herd Book of Queensland
W. Rudd	Christmas Creek, Beaudesert	2	10	Do.
A. Rodgers	Torran's Vale, Lane-field	1	9	Do.
W. Middleton	Devon Court, Crow's Nest	3	27	Do.
A. K. Yorksten ..	"Dunure," Miles ..	2	8	Do.
W. H. Francis ..	"Exelawn," Colinton, Brisbane Valley Line	3	5	Do.
BEEF BREEDS.				
SHORTHORNS.				
T. B. Murray-Prior ..	Maroon, Boonah ..	2	37	Queensland Shorthorn and Australian Herd Books
C. E. McDougall ..	Lyndhurst Stud, Warwick (2)	25	100	Queensland Shorthorn Herd Book
Godfrey Morgan ..	"Arubial," Condamine	3	6	Do.
W. B. Slade	E. Glengallan, Warwick	2	20	Do.
HEREFORD.				
A. J. McConnell ..	Dugandan, Boonah	19	36	Australian Hereford Herd Book
E. M. Lumley Hill ..	Bellevue House, Bellevue	45	127	Do.
Tindal and Son ..	Gunyan, Inglewood	50	400	Do.
SUSSEX.				
James T. Turner ..	The Holmwood, Neurum	2	4	Sussex Herd Book of England

RECORD LAMBING.

Mr. J. Buchanan, a farmer at Glen Lamington, who owns a small flock of sheep, informs us that one of his ewes had four lambs at last lambing—a case very unusual. Twins in his flock are common. Last year one of the ewes had triplets, and he believes it to be the same one which this year had four. All of this progeny are males. Mr. Buchanan would like to hear of any other owner of a small flock who has had a similar experience.

With reference to the above, Mr. W. G. Brown, Instructor in Sheep and Wool, Department of Agriculture and Stock, says:—

“This is another instance of the fecundity of the Border Leicester breed. It is the first instance of quadruplets which has come under my notice in connection with any breed. I have seen numerous cases of triplets in this breed, notably on Logie Plains, Mr. Geo. Hartnoll owner; and twins are very common. They are also very good mothers, and invariably give a big supply of milk to their lambs.”

SOME CHAMPION AMERICAN DAIRY COWS.

The American champion cow “Tilly Alcatra” is the world’s record holder with 33,424 lb. of milk in 365 days. Her records for five years, as published in the American official journal of the Friesian Club, are:—

Age.	Days in Milk.	Milk. lb.	Butter. lb.
2y. 6m.	285	14,837.2	556.20
3y. 6m.	365	24,421.3	
5y. 1m.	365	30,451.4	
6y. 5m.	365	29,826.6	
7y. 7m.	365	26,814.6	
9y. 3m.	365	33,424.8	
10y. 6m.	305	23,684.1	
For 7 periods		180,460.2	

SISAL HEMP.

Lately the Agricultural Department has received several inquiries as to the cultivation of sisal hemp from some who wish to give it a trial. During the war Mexican and East African sisal were worth over £100 per ton. Of late, however, we hear from all parts of the world, where the fibre is grown, that this commodity is in much the same position as Manila hemp in the Philippines. Messrs. Landauer and Co., London, in their monthly hemp and fibre report for September, 1920, write: “It is reported that workmen in Yucatan (Mexico) can no longer exist on the old wages. Work on the plantations is ceasing, as hemp can only be produced at a loss under present conditions. Unless prices improve, the inevitable result will be a considerable reduction in yearly production. Meanwhile, Mexican sisal is not being bought by consumers in Europe, and unless American mills are prepared to pay an adequate price they are likely to run short of material for next binder twine season.”

The present prices for East African sisal are from £42 to £54 (for prime) per ton. Java sisal has sold at from £58 to £63 per ton, while Mauritius is unobtainable.

There can be no doubt that if it will not pay to grow and produce sisal in black and coloured-labour countries, where wages, as a rule, are very low, it will never pay in our British tropical countries, where white labour alone is employed. In 1912 the cost of growing and producing the fibre amounted to about £12 per ton, whilst the fibre sold readily at £25 to £30 per ton. But to-day wages and cost of machining and freights have so risen that we consider it inadvisable to start sisal growing again in this State.

The Horse.

BITTING AND BREAKING HORSES.

One of the most serviceable bits for general use is the Liverpool bit, but whatever the pattern may be, it should be properly fitted to the mouth. A severe bit not only punishes the horse, but hardens the mouth. Some bits, often those worn by show horses, possess ports deep enough to half choke the wearer, and as often as not the horse would go better without the latter addition were a thick, straight bit, either of steel or indiarubber, in his mouth instead of the massive arrangement which is torture to him. There are, of course, naturally defective mouths and mouths which have been spoiled by bad breaking, and there are likewise horses which from some cause or other require special biting. In such cases exceptional treatment is necessary, and perhaps the best bit of all to control a trotter is one of the pattern known as the Mowhawk. A tight curb chain is a constant source of unnecessary pain, and some chains are far too narrow, cutting into the flesh and causing the animal to fidget and throw his head back. It is a fact that more horses are injured by having an inappropriate bit forced into their mouths than by any other cause. If those concerned would only pause to give themselves time to remember that the mouths of horses differ very considerably from one another there would be fewer accidents.

The education of the horse should be like that of the child. Pleasure should be as much as possible associated with the early lessons, while firmness, or, if need be, coercion, must establish the habit of obedience. It is surprising how soon, under a system of kind management, the animal which has been accustomed to go where he pleased and to do what he thought fit may be taught to yield up his will to another and to obey with alacrity his master's bidding. If there is a kind-hearted servant about your premises who is capable of undertaking the task, he will be more likely to succeed than the average colt-breaker, who seldom has any conception of attaining his object by the moral influence which kindness would give him over the youngster. A horse is well broken when he has been taught implicit obedience to his rider or driver and dexterity in the performance of his work. A dogged, sullen, and spiritless submission may be enforced by the cruel and brutal usage to which the breaker so often has recourse, but that prompt and eager response to the slightest intimation of the rider's will, the manifest aim to anticipate every wish, which gives to the horse so much of his value must be founded on habitual confidence and attachment.

Imperfect vision is responsible for many a horse bolting and shying. The latter vice is more frequently the result of a high-spirited animal being ruined by an injudicious coachman. Nothing, however, will cure a horse of imperfect vision of the habit of bolting. No bit will stop him when he once makes up his mind to go away. Such a combination as a net and Mowhawk bit have been proved to be useless when the animal is once scared. The difficulty is that in many cases there is nothing about the eyes to arouse suspicion, and even practitioners often fail to detect anything wrong with the sight. Cribbing and wind-sucking are vices which one horse can impart to another, and animals which possess them should not be allowed to remain an hour longer in any owner's stable than is absolutely necessary. Jibbing is a terrible accomplishment for any horse to possess, and the man who can devise an infallible cure for it would deserve a great reward. Some have succeeded in making a jibber move by having a piece of rope dragged backwards and forwards on the inside of his forelegs behind his knees, not sufficiently hard to injure the skin, but hard enough to make him feel it.—“Live Stock Journal,” London.

Dairying.

DO WE OVERFEED MILK?

A correspondent of the "Live Stock Journal," London, writes on this subject:—

Should a pig be allowed to eat all it wants is a question more easily asked, perhaps, than answered. Something depends on the purpose for which it is kept. It is rather significant that when judged by feeding standards which have been found on the average to be adequate, if not ample, for pigs in feeding trials, and which have been most carefully drawn up, every-day feeding will often be found to exceed them. There is no doubt at all that this is partly due to the latter being badly put together, which is a fruitful cause of waste, and appetites vary; but some of the overfeeding is due, perhaps, to the lavish use of milk, failing to recognise that milk solids are worth nearly two of meal, even when the fat has been removed.

For example, in the following rations, which seem popular for pigs of, say, 150 to 200 lb. respectively, the milk would seem to be reckoned as little more than a vehicle for the meal, for the dry matter which the latter supply is equal to the live-weight feeding standard mentioned above, and recognised as sufficient:—

				(1) Pigs 150 lb.			(2) Pigs 200 lb.		
				Meal equivalent.		Dry matter.	Meal equivalent.		
			lb.	lb.	lb.	lb.	lb.	lb.	
Barley meal	..	..	4	..	4	..	3½	..	6
Potatoes	..	..	3	..	0¾	..	0¾	..	6
Separated milk	..	..	10	..	1¾	..	0¾	..	1¾
				—		—	—		—
				6½		5	7		
				—		—	—		—
Amount of d.m. required				4½-5		—	—		5½
for our feeding standards									

(1) Was recommended before the Farmers' Club in 1911 as a paying ration in common use for pigs of 80 lb. to bacon size, and putting on 15 lb. weekly.

If this is so, it only shows that it pays to feed somewhat higher than standards prescribe. (We note the Danish are considerably higher, and they know a few things about pigs.) Or would it pay better still not to exceed them? But these limits in live weight are too wide, and 15 lb. increase is unusual.

With store stock the standards are probably ample, according to the requirements and the exigencies of the bacon trade, and the wise course appears to be to keep on a correctly blended foundation ration, and raise or lower the total (and incidentally the nutritive values) according as rough stuff has to be consumed, and probably not give full rein to their appetites; but with fatteners, so long as the food is digested, the old rule of giving as much as they will eat up seems to be a sound one on the various grounds on which early maturity and rapid fattening are so much to be commended. And healthy pigs generally have good digestions.

Let us compare the above with what has been stated to be a likely ration for a pig of 60-120 lb. live weight (i.e., "class 3") in Denmark:—

				Meal equivalent.		Amount of d.m. required by our feeding standards.	
			lb.	lb.	lb.	lb.	
Skim milk	..	..	6	..	1	..	
Barley meal	..	..	4½	..	4½	..	
Boiled potatoes	..	..	2	..	0½	..	
				—		—	
				6		3½-4	

It will be seen that the practical example (1) quoted above and the Danish nearly agree, but the pigs are not equal in weight, and it is significant that the milk is only half the English allowance, as in Denmark they only feed milk in about half the proportion of whey. Do we waste milk by over-generous proportions and quantities? That is the point.

But the difference between our feeding standards (dry matter) and the examples given is not so great as appears at first sight, as pig meals contain a considerable percentage of moisture, and, as dry matter (bulk), milk ranks no higher than meal, for a certain bulk of food is laid down by feeding standards for pigs as it is for cows, without which they would hardly feel satisfied. And, indeed, it is not possible with ordinary foods to reach the high standard of digestibility required by these standards without the use of milk for young pigs in considerable quantity.

But when these standards are exceeded, or when for older pigs milk is freely used where it has not the same value as for younger pigs, the matter is rather different, and it is easy, it would seem, to use milk wastefully. Perhaps the Danes realise this better than we do. The point is of more significance, perhaps, than at first appears, because it seems fairly clear from experiments that the proportion in which milk is mixed is of significance, and that the nearer this approaches the dry food in weight the more valuable it is. And the Danes would seem to have hit upon the best proportions (as their food values have been severely tested), which amount to from 12 to 30 per cent. food value of the total ration, which, already large, is thus further improved as compared to our more liquid one. Should we get better value if we gave less milk, and so lowered the albuminoid ratio and very high digestibility of our feeding standards, to that approved of in Denmark?

And the Leeds and Cockle Park experiments show us that this can be done satisfactorily (and with little pigs) by the use of peas or gram, without even using milk, as it often is in practice, especially with the somewhat indigestible fish meal, and, moreover, with amounts of food under rather than over standard.

DEHORNING COWS.

We have published in many previous volumes of this journal articles dealing exhaustively with this subject, and the following article, which we take from "The New Zealand Farmer," bears out practically everything which we have written on dehorning dairy cattle, and in all cases it has been recommended to perform the operation, a painless one, on young dairy stock before the horns have passed the bud stage. The wonder is that the advice so frequently given is generally disregarded, notwithstanding proof positive of its value:—

"A practical dairy farmer, except he is a faddist, will not dispute the contention that a dehorned herd of dairy cows is more profitable than one of similar milking capacity which is not dehorned.

"Generally speaking, the milk cow is a timid animal, and when the individual member of the herd is living in continual fear of injury from the horns of other members, she will certainly not yield so much milk as she would if living under more peaceful circumstances. Further, the danger of serious injury to a valuable cow is always present when the herd is not dehorned. It is also well worth noting that every improvement of this kind is the means of lessening the dairy farmer's worries, and he will always find plenty of unavoidable worries, even in the absence of those which are preventible.

"Dehorning the mature cow is neither a serious nor difficult operation, although it is infinitely better to carry out the operation in the calf stage. A good, strong dehorning bail is essential, also a dehorning instrument, which is much quicker than the saw. The work may be carried out at any time of the season, but the writer prefers cold weather to hot. The horn should be cut as close to the head as possible, the instrument being held in a sloping position instead of a horizontal one.

"In a few months after the operation a properly dehorned cow will look as if she had been born so. The absence of dehorning also causes enormous yearly loss among fat stock when being shipped to the butcher or freezing works. Not only are hides very often seriously injured, but many of the carcasses are badly disfigured, some so badly that they have to be condemned and boiled down. Only those who have spent several months on active duty in a freezing works can sufficiently realise the extent of the damage caused by horned fat stock.

“In the writer’s opinion, dehorning, at least of dairy stock, should be compulsory. No argument in favour of retaining the horn has ever been advanced that could be used in the interest of economy, and we have reached a time when matters of this kind should be viewed from a common sense, practical standpoint. It is admitted that a certain shape of horn appeals to the breeder, but, after all, is not such a taste merely a child of custom? In the writer’s opinion, the larger breeds look better without horns than with them. At best, horns are merely a relic of barbarism, and should have no place in domesticated life.

“The calf stage is the proper time for dehorning dairy stock, and it is then a simple and painless operation.

Although the writer has previously described the process, it may be permissible to again refer to it for the benefit of the inexperienced. Calf dehorning, to be effective, should be done when the calf is from two to five days old—not later—and all that is required for the operation is a stick of caustic potash. To prevent injury to the fingers the stick should be wrapped in strong brown paper when in use, and when not in use the caustic potash should be kept in a tightly-corked bottle.

“The operator should have someone to hold the head of the calf firmly. First clip the hair from around the base of the horn bud, then slightly moisten the stick of potash and apply it firmly to the top of the horn, rubbing with a circular movement for about half a minute, then make a brief pause and repeat the rubbing. If the work is carefully carried out at the proper stage no vestige of a horn will ever appear, but it must not be delayed until the horn bud becomes hard. Care must be taken when moistening the stick of potash, because, if too much moisture is used, there is danger of it dropping into the eyes of the calf and causing permanent injury. Of course, it should not be necessary to advise the operator against wetting the stick with his tongue—it will only occur once if he does.

“Ear-marking and tattooing should be done at the same time, and all particulars carefully entered in a herd book. Tattooing, if the particulars are carefully booked, absolutely prevents mistakes being made as to the identity of the calf, which is a matter of the utmost importance, even in a non-pedigree herd.

“The udders of heifer calves should be examined, and superfluous teats, if any, cut off. The appearance of a good cow’s udder is often spoiled by neglecting this simple operation in the calf stage.”

MILCH GOATS.

By W. C. CARMODY.

Much has been written on the above subject regarding housing, feeding, &c., but all is not applicable to Australia and Australian conditions.

That the goat is a wonderful animal there is no denying. If fed and handled intelligently, the nannies will produce three times as much milk as they would if allowed to forage for themselves.

To get good results, prime lucerne chaff, bran, and linseed meal are required. A standard ration is 2½ lb. lucerne chaff, 2 double handfuls bran, 1 handful linseed meal (once a day, or half a handful twice a day). The above is sufficient for one feed, but where goats are not allowed to forage, the same ration twice a day is required, preferably in the morning and at night, at milking time. They are very fond of bread, and will eat it at any time. Sweet potatoes are also useful, to add variety to the standard feed.

Grain, particularly maize, is too heating, and will dry them off if persisted in. The writer found that occasionally a tablespoonful of oats, mixed through the chaff did no harm, and gave variety, and nanny likes to search for the grains. Clean drinking water must be accessible at all times.

Goat’s milk is particularly valuable for infants and invalids, because, owing to the smallness of the butter fat particles, it is easily assimilated by the weakest stomach, and there is no need to boil or scald the milk, as goats do not suffer from tuberculosis. Goat’s milk is equal to mother’s milk in regard to size of butter fat particles, and this explains the reason of its being so suitable for infants. The ass equals the goat in this respect, but the lactation period of the former animal is only two months, whereas the much despised nanny will milk profitably for 18 months, if kept from the buck. Goat’s milk contains from 5 to 8 per cent. of butter fat, ass’s milk 2 per cent., and as both goat’s and ass’s milk is most suitable for infants, it is clearly demonstrated that it is not the percentage of butter fat that counts, but

the fineness of the butter fat particles. The Angora is not a good milker, and therefore there is no choice but to get selected animals of the common breed. In selecting milkers, it is advisable to see them milked; and when this is done, the udder should be soft and yielding, and much reduced in size. The bag should show well up the escutcheon when distended.

There are two breeds of Swiss goats which are famous, viz., the Saanden and the Toggenburg.

Nubia also produces a famous milker, known as the Nubian. The Nubian is the Jersey among goats, and the Saanden the Holstein, in comparison with milch cattle.

The Saanden has the highest yield, a goat of this class being officially credited in England with a yield of 5 quarts some ounces per day, after being in milk five months.

The Commonwealth quarantine restrictions prohibit the introduction of animals from the Continent by individuals, but the Government of any State of the Commonwealth can introduce domesticated animals from any part of the world. (*Vide Commonwealth Gazette*, No. 48, of the 17th June, 1911).



Under this section the New South Wales Government introduced some Saanden goats from Switzerland in 1915 about.

The New South Wales Government will sell bucks of this breed for £10 10s. each (the supply would be limited), but no does are for sale. I understand that up to one gallon per day has been given by the does which are owned by New South Wales.

The milch goat question is an important one, and is deserving of serious attention, with the object of producing a goat that will give, say, a gallon of milk per day or over if possible.

The writer experimented with the common breed, and got a return of two quarts a day when fresh, and fed on the lines indicated, and $1\frac{1}{2}$ quarts per day from a goat that had been in milk 16 months.

[Seeing that milch goats yield so much wholesome milk for so many consecutive weeks and months, and that they can be so cheaply fed, it is strange that suburban dwellers have not made a trial of this source of milk. They would thus have no trouble about watered milk, nor of a rise in price in drought times. The first cost is very small, and any little outhouse with a light roof will accommodate the animal, whilst the goat will thrive where a cow would starve.—ED. Q.A.J.]

SPECIFICATION FOR LAYING THE FLOOR OF COWBAILS WITH PORTLAND CEMENT CONCRETE.

Numerous inquiries having been made by our correspondents, especially by those engaged in the dairying industry, desirous of laying a permanent flooring in the milking-sheds, we publish *pro bono publico*, the following instructions kindly supplied to us by Mr. A. Morry, surveyor and engineer of the Department of Agriculture and Stock.

The ground to be carefully excavated to a regular surface with a fall of not more than 3 in. from the front of the bails to the back; any inequalities to be filled up with hard materials and well rammed with a wood or iron rammer.

Before starting to lay the concrete, fix wood screeds at top and bottom of the shed, the bottom screed to be 3 in. lower than the top one; these screeds to be fixed 4 in. above the ground line so that when the concrete is laid, rammed, and ruled off it will be of a regular thickness of 4 in. throughout. For ruling off, use a long straight-edge with bottom edge shot perfectly true with the plane.

Concrete to be composed of approved Portland cement in the proportion of 1 cask or 3 bags to 1 cubic yard of clean river or creek gravel, with all stones more than 1 in. in size taken out; or, failing gravel, 4 parts of broken stone which will pass through 1½-inch mesh and 2 parts sand to 1 part of cement. This makes a concrete technically known as 4—2—1; but it must be understood that 1 cubic yard or 27 ft. cube of dry materials will not make 1 cubic yard of finished concrete, because the finer materials such as sand and cement go to fill up the spaces left in the larger material such as stone. The shrinkage in finished concrete, when rammed, is from 23 to 27 per cent. of the dry materials, so that about 31 ft. of gravel and cement is required for 1 yard cube of finished concrete.

The most convenient method of measurement is to make a box 3 ft. x 3 ft. x 1 ft. without top or bottom. Fill it with gravel or stones and sand, and add 1 bag of cement. This will give a good mixture. Turn it over twice dry, and twice when wet; then place it in position 4 in. in thickness between the screeds, level off with the straight-edge and well ram until the water comes to the surface; take care that no holes are left on the surface in which the water can lodge. Do not lay on a coat of cement for finishing, as this very often comes off after a time, but endeavour to get a good face with the rammer. If this is not satisfactory, make a grout of water with equal parts of sand and cement, stir up well until it is quite thick—too thick to flow. Pour this out on to the floor and brush it over with a stiff broom, taking care not to leave any lumps or inequalities. This will make a good and durable floor.

The open drain should be made with the same material, with 6 in. x 2 in. curb of hardwood on each side, and it is better finished with the trowel for a smooth face.

One cubic yard of concrete or 27 cubic ft. will be sufficient for every 8 superficial yards of floor 4 in. thick. This will require 3 bags of cement and 31 cube feet of dry materials for each cube yard.

A WONDERFUL INSTRUMENT.

An instrument that can detect the presence of a man 200 yards away merely by the heat his body radiates seems incredible, but that is only because most of our natural senses are so dull compared with the artificial senses devised by science, says "Everyday Science."

Such an instrument was perfected just before the end of the war, and would probably have been used if the fighting had lasted another winter. It consists of a thermopile, or very sensitive thermometer, set in the focus of a concave mirror, together with a galvanometer. The heat radiations of any object warmer than the surrounding atmosphere, where focussed by the mirror, act on the thermopile and cause deflections of the galvanometer. In actual tests on cold nights the instrument recorded the heat rays from the body of a man 600 ft. away, and a man lying in a shell-hole 400 ft. away was detected as soon as he lifted his head above the ground level. No man could cross the range of the instrument without his presence being indicated. The instrument was to have been used for watching "No-man's-land" on winter nights and giving warning of raids.

Poultry.

REPORT ON EGG-LAYING COMPETITION, QUEENSLAND AGRICULTURAL COLLEGE, OCTOBER, 1920.

In spite of the excessive heat and the storms which prevailed during the month, the laying was very satisfactory, especially in the light breeds. Broodiness has been rather troublesome in the heavy section, and eight Leghorns from the 102 in the light breed groups were broody also. In the singles, four birds laid the possible 31 eggs, two 30 eggs, eleven 29 eggs, and twelve 28 eggs. N. A. Singer's pen laid the highest total for the month in the light section, with 168 eggs. A Shank's and E. F. Dennis's Black Orpingtons in the heavy section each laid 157 eggs. The best laying in the groups was done by the pen owned by Mrs. R. Hodge, with 163, an average of just over 27 eggs per bird. There was one death during the month, Mr. L. G. Innes losing his "A" hen from ovarian disorder. The health of the birds is now good. The following are the individual records:—

Competitors.	Breed.	Oct.	Total.
--------------	--------	------	--------

LIGHT BREEDS.

*G. Trapp	White Leghorns	155	909
*Haden Poultry Farm	Do.	154	904
*O. W. J. Whitman	Do.	153	899
*J. M. Manson	Do.	156	866
Geo. Lawson	Do.	125	865
*J. J. Davies	Do.	146	861
*J. Newton	Do.	149	861
*Quinn's Post Poultry Farm	Do.	155	856
*W. Becker	Do.	148	833
*Dr. E. C. Jennings	Do.	153	832
*S. McPherson	Do.	121	823
*W. and G. W. Hindes	Do.	147	819
*N. A. Singer	Do.	168	815
*J. H. Jones	Do.	141	809
*H. Fraser	Do.	140	803
*G. Williams	Do.	141	803
*L. G. Innes	Do.	153	803
*E. A. Smith	Do.	147	798
Mrs. R. Hodge	Do.	163	794
*T. Fanning	Do.	125	794
*Mrs. L. Anderson	Do.	144	778
S. L. Grenier	Do.	129	769

EGG-LAYING COMPETITION—*continued.*

Competitors.	Breed.	Oct.	Total.
--------------	--------	------	--------

LIGHT BREEDS—*continued.*

Thos. Eyre	...	...	...	...	White Leghorns	...	128	766
*B. Chester	...	...	...	...	Do.	...	150	763
*S. W. Rooney	...	...	...	...	Do.	...	130	755
*Range Poultry Farm	...	...	...	...	Do.	...	137	754
*Mrs. Henderson	...	...	...	...	Do.	...	145	745
*Thos. Taylor	...	...	...	...	Do.	...	146	738
W. Morrissey	...	...	...	...	Do.	...	128	727
Avondale Poultry Farm	...	...	...	...	Do.	...	141	719
E. Chester	...	...	...	...	Do.	...	141	715
H. P. Clarke	...	...	...	...	Do.	...	131	696
R. C. J. Turner	...	...	...	...	Do.	...	129	682
C. Langbecker	...	...	...	...	Do.	...	119	673
C. M. Pickering	...	...	...	...	Do.	...	117	660
C. H. Towers	...	...	...	...	Do.	...	131	656
A. J. Andersen	...	...	...	...	Do.	...	87	653
S. Chapman	...	...	...	...	Do.	...	122	638
W. D. Evans	...	...	...	...	Do.	...	135	620
H. A. Mason	...	...	...	...	Do.	...	138	620
C. A. Goos	...	...	...	...	Do.	...	139	578

HEAVY BREEDS.

*R. Holmes	...	...	...	...	Black Orpingtons	...	132	909
*E. F. Dennis	...	...	...	...	Do.	...	157	902
*R. Burns	...	...	...	...	Do.	...	137	879
*D. Fulton	...	...	...	...	Do.	...	122	878
*A. Shanks	...	...	...	...	Do.	...	157	877
*A. Gaydon	...	...	...	...	Do.	...	135	842
*E. Morris	...	...	...	...	Do.	...	124	841
H. M. Chaille	...	...	...	...	Do.	...	133	840
*W. Smith	...	...	...	...	Do.	...	122	809
*A. E. Walters	...	...	...	...	Do.	...	113	808
J. E. Smith	...	...	...	...	Do.	...	126	767
*E. Oakes	...	...	...	...	Do.	...	108	759
*J. Cornwell	...	...	...	...	Do.	...	150	759
*T. Hindley	...	...	...	...	Do.	...	121	754
*R. B. Sparrow	...	...	...	...	Do.	...	124	736
G. Muir	...	...	...	...	Do.	...	127	733
Mrs. G. H. Kettle	...	...	...	...	Do.	...	136	723
Parisian Poultry Farm	...	...	...	...	Do.	...	129	730
R. C. Cole	...	...	...	...	Do.	...	118	706
*J. E. Ferguson	...	...	...	...	Chinese Langshans	...	126	681
*Nobby Poultry Farm	...	...	...	...	Black Orpingtons	...	108	667
*E. Stephenson	...	...	...	...	Do.	...	124	660
Miss E. M. Ellis	...	...	...	...	Do.	...	With-	583
G. Flugge	...	...	...	...	Do.	...	drawn	543
Total	...	...	...	...	...	...	8,669	49,838

* Indicates that the pen is being single tested.

DETAILS OF SINGLE HEN PENS.

Competitors.	A.	B.	C.	D.	E.	F.	Total.
LIGHT BREEDS.							
G. Trapp	162	145	157	151	157	137	909
Haden Poultry Farm	175	126	167	157	136	143	904
O. W. J. Whitman	139	141	161	147	150	161	899
J. M. Manson	148	148	158	141	127	144	866
J. J. Davies	150	143	142	160	140	126	861
J. Newton	168	134	147	103	151	158	861
Quinn's Post Poultry Farm ..	158	152	150	142	122	132	856
W. Becker	145	143	152	136	118	139	833
Dr. Jennings	134	156	125	128	130	159	832
S. McPherson	153	148	91	136	161	134	823
W. and G. W. Hindes	146	136	121	143	126	147	819
N. A. Singer	140	123	141	156	133	122	815
J. H. Jones	133	133	141	145	148	109	809
H. Fraser	119	129	146	141	142	126	803
G. Williams	132	135	136	131	154	115	803
L. G. Innes	86	128	156	142	159	132	803
E. A. Smith	132	120	148	130	136	132	798
T. Fanning	55	145	138	149	154	153	794
Mrs L. Anderson	154	140	146	117	110	111	778
B. Chester	130	104	132	139	132	126	763
S. W. Rooney	104	104	149	122	132	144	755
Range Poultry Farm	95	133	131	147	119	129	754
Mrs. Henderson	109	120	132	122	140	122	745
Thos. Taylor	149	132	95	130	113	119	738
HEAVY BREEDS.							
R. Holmes	141	160	150	146	154	158	909
E. F. Dennis	154	134	155	154	147	158	902
R. Burns	145	125	167	129	169	144	879
D. Fulton	154	162	139	142	90	191	878
A. Shanks	130	145	137	170	115	180	877
A. Gaydon	139	173	136	118	109	167	842
E. Morris	146	143	150	116	137	149	841
W. Smith	94	164	153	151	125	122	809
A. E. Walters	129	134	121	155	116	153	808
E. Oakes	120	153	135	59	150	142	759
J. Cornwell	124	162	129	92	112	140	759
T. Hindley	130	154	123	149	80	118	754
R. B. Sparrow	136	74	142	124	112	148	736
J. E. Ferguson	74	123	88	115	156	125	681
Nobby Poultry Farm	129	171	83	171	93	20	667
E. Stephenson	145	109	107	124	93	82	660

CUTHBERT POTTS,
Principal.

THE FOWL TICK.

A Southern poultry breeder troubled with ticks amongst his fowls would like to see a paper on the subject by Mr. Beard, Instructor in Poultry Raising. He apparently has not seen the very informative article on "The Fowl Tick," by that gentleman, which was published in the "Queensland Agricultural Journal," in August, 1917. As there may be others in like case, we republish the information given in that issue of the Journal. The matter was also discussed at the Poultry Conference at Gatton College, on 29th September last, on which occasion Mr. Walters moved, and Mr. Anderson seconded, a motion that the Agricultural Department be asked to allow Mr. Beard to prepare a pamphlet on the tick. The motion was carried.

Following is Mr. Beard's article:—

SYMPTOMS.

Fowls that have been infested by ticks and recover become immune from further attack. This explains the reason why sometimes flocks of fowl are apparently in the best of health and condition, yet, if examined, they will be found to be covered with the larval ticks, and the houses may be found swarming with the pest. If clean

fowls are put into these yards they will at once become affected and, in three or four days, the result of tick worry and inoculation by the pest, fever will be at its height. The fowls will appear drooping and listless, the combs becoming quite pale; they then lose the use of their legs. Severe diarrhœa sets in, death resulting in a few hours. The better condition the clean birds are in the quicker the poison will act. The fowl ticks themselves are infested with a parasite which they pass into the blood of the fowl, where it becomes a blood parasite, and the micro-organisms multiply with such marvellous rapidity that, in most cases, the fever causes the death of the birds. Every bird in turn becomes a centre of infection for healthy ticks that suck its blood, thus becoming in turn infected, and transmitting the blood parasites into a fresh victim. This disease is known as Spirochaetosis in fowls and is caused by a blood parasite. This tiny organism is conveyed from ticks to healthy fowls through the bite of the commonly known poultry tick (*Argas persicus*), its incubation period ranging from three to nine days.

The ticks are capable of transmitting the disease to healthy birds five months after feeding upon the blood of (*Sphirochaeta*) infested fowls.

All poultry, fowls, ducks, geese, and turkeys are subject to the disease, but the losses are always greater amongst the first mentioned. This may be accounted for by the fact that the latter are more restless in their habits, therefore the "seed" ticks have not such opportunities of attaching themselves to these birds.

REMEDY AND PREVENTION.

Once the ticks have firmly established themselves in the fowlhouse, it is almost impossible to eradicate them. Therefore the houses and fences should be burnt, likewise any trees that may have been in the pens, and the ground thoroughly disinfected with some strong solution. From experience the following have been found very effective remedies:—Pure kerosene, crude petroleum, creosote, or some of the standard dips, used at a strength of one part of the dip to three parts of water.

The new houses should be of iron, with as little woodwork as possible. The perches, which should be tick proof, can be procured at almost any ironmongery or poultry supply store. A good plan for a perch is to put two supports of sawn timber into the ground. Drive a nail into each at the top; bore a hole in each end of the perch so that the nail will just go through, and then lay the perch in the supports. This will keep it in position, and the perch can be lifted up to see if any ticks are underneath. Tie a piece of flannel round each support of the perch about half way up and, if there are any ticks about, you will in time catch them all, as after feeding on the fowls they will start for their hiding place, but, being full and lazy, will take the first shelter offering, thus you will find them under the perches or under the flannel. The latter can be removed and be burned along with the ticks that hide in it, and be replaced with fresh clean flannel.

Every care should be exercised to ascertain that all birds coming into the yard are clean and free from disease and pests. If there is the slightest doubt, the birds should be placed in strict quarantine for nine days and the coops in which they have been kept thoroughly inspected. If young ticks are discovered clinging to the bodies of the fowls, the birds should be dipped in a strong solution of phenol or Cooper's sheep dip, 1 part of the dip to 200 parts of water, which will kill the pests. After the birds have been dipped in the solution they should be given a teaspoonful of port wine every few hours, and kept in a dry, warm place.

If the fowlhouses are not badly infected the tick can be eradicated by thoroughly spraying with some of the solutions previously mentioned.

On account of its cheapness and the fact that it is so easily prepared, the following is recommended:—Boiling hot soapsuds, to which add $\frac{1}{2}$ oz. crude carbolic to the bucketful. The action of this solution is sure, and if properly applied it will penetrate into the smallest cracks and crevices, which a thicker solution would not reach.

Hot coal tar is also a good thing to use on fences and buildings, but care must be taken that it gets into all the cracks.

If whitewash is used, care must be taken that it is not applied too thick, because as the wash dries a space is left between it and the wood, which makes a good harbour for the pests.

There is yet another method which I have found to be very effective, and that is the use of a blow lamp (such as painters use). The heat and flame from this lamp will penetrate into the smallest cracks and kill all pests that may be concealed therein.

If the poultry keeper will follow out these simple instructions, his yard should soon become free from the pest, and if it does not remain so, he will only have himself to blame for lack of the precautionary measures suggested in regard to the introduction of fresh birds, coops, &c., or non-observance of those warnings contained therein.

FINAL REPORT OF THE SIXTEENTH EGG-LAYING COMPETITION, QUEENSLAND AGRICULTURAL COLLEGE, PART 3.

Owner.	Breed.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Total.
LIGHT BREEDS.														
T. Fanning	White Leghorns	62	125	123	142	156	163	165	146	145	138	124	138	1,627
J. M. Manson	Do.	96	121	126	145	155	154	156	151	130	125	117	120	1,596
E. A. Smith	Do.	80	119	98	131	145	151	152	140	139	135	118	110	1,518
W. Hindes	Do.	106	126	118	131	147	145	140	125	107	133	95	104	1,477
Dr. E. C. Jennings	Do.	89	99	101	128	141	142	146	131	132	121	90	111	1,431
G. W. Hindes	Do.	90	99	98	125	140	139	141	117	121	118	106	109	1,403
W. Becker	Do.	67	97	76	109	138	141	146	135	124	133	115	108	1,389
Haden Poultry Farm	Do.	87	97	108	123	136	138	139	120	107	108	96	86	1,345
Range Poultry Farm	Do.	94	93	90	121	133	141	141	125	117	117	90	73	1,335
B. Caswell	Do.	67	97	87	107	134	147	147	139	121	115	87	74	1,322
Quinn's Post Poultry Farm	Do.	90	67	97	115	141	149	153	125	116	113	88	63	1,317
Dixie Egg Plant	Do.	116	106	111	133	135	148	138	102	111	97	69	49	1,315
C. P. Buchanan	Do.	75	97	86	114	131	133	136	129	114	119	81	85	1,300
Harold Fraser	Do.	80	84	76	118	137	133	138	120	118	116	92	77	1,289
S. McPherson	Do.	84	83	106	129	129	124	124	109	107	114	82	79	1,270
W. Lyall	Do.	89	82	60	105	118	136	125	118	124	124	90	97	1,268
J. H. Jones (Toowoomba)	Do.	99	85	60	123	137	135	142	127	118	101	72	65	1,264
W. A. Wilson	Do.	47	60	108	122	133	129	128	124	117	115	93	79	1,255
L. G. Innes	Do.	58	67	75	120	145	144	158	141	119	79	74	54	1,234
J. J. Davies	Do.	7	78	106	126	137	141	143	129	118	88	84	70	1,227
Thos. Taylor	Do.	90	48	37	103	139	149	143	115	111	108	107	76	1,226
Mrs. A. G. Hurth	Do.	27	71	68	120	138	141	142	128	128	102	85	69	1,219
Mrs. L. F. Anderson	Do.	27	58	103	131	137	144	137	122	110	107	86	44	1,206
S. W. Rooney	Do.	82	72	73	121	122	121	132	102	102	94	107	55	1,183
G. J. Byrnes	Do.	66	101	89	125	121	118	121	103	95	98	91	55	1,183
Mrs. N. Charteris	Do.	72	48	56	93	113	129	123	116	121	117	100	92	1,180
G. Williams	Do.	83	94	82	109	136	125	119	106	102	88	52	45	1,141
N. A. Singer	Do.	53	33	18	110	130	148	134	99	120	90	104	92	1,131
G. Trapp	Do.	80	73	45	94	116	129	135	124	112	77	78	55	1,118
Mrs. R. Hunter	Do.	53	90	68	105	112	124	131	119	100	93	71	47	1,113
O. W. J. Whitman	Do.	54	33	58	93	127	129	137	125	115	97	73	70	1,111
H. A. Jones (Orallo)	Do.	61	92	81	107	126	132	120	81	104	77	62	64	1,107

[illegible]

HEAVY BREEDS.

R. Holmes	..	..	Black Orpingtons	..	94	146	151	153	167	147	150	132	113	125	116	125	1,619
E. F. Dennis	..	..	Do.	..	80	97	136	150	156	160	157	139	131	132	110	132	1,547
R. Burns	..	..	Do.	..	100	102	115	152	158	147	152	131	132	126	103	123	1,541
E. M. Larsen	..	..	Do.	..	122	127	101	131	145	151	152	122	106	97	83	83	1,420
W Smith	..	..	Do.	..	88	110	108	118	162	149	144	114	109	108	87	109	1,406
A. E. Walters	..	..	Do.	..	88	131	105	128	146	131	140	103	118	112	100	78	1,380
E. Morris	..	..	Do.	..	56	116	114	130	143	125	133	115	102	101	102	99	1,336
Kelvin Poultry Farm	..	..	Plymouth Rocks	..	67	104	114	144	147	130	130	106	80	101	91	95	1,309
Mars Poultry Farm	..	..	Black Orpingtons	..	34	66	68	120	145	144	154	115	111	121	106	87	1,271
Geo. Nutt	..	..	Do.	..	113	109	122	124	146	135	111	97	79	91	75	65	1,267
T. Hindley	..	..	Do.	..	42	89	89	118	146	137	131	118	112	108	86	78	1,254
R. B. Sparrow	..	..	Do.	..	50	41	45	101	142	144	149	136	120	116	104	100	1,248
Jas. Ferguson	..	..	Chinese Langshans	..	57	94	102	124	126	119	123	102	92	99	95	100	1,233
Nobby Poultry Farm	..	..	Black Orpingtons	..	95	99	83	127	136	143	122	105	93	92	69	59	1,223
A. Shanks	..	..	Do.	..	78	101	116	133	150	141	118	86	87	68	62	42	1,182
A. Homan	..	..	Do.	..	55	50	77	131	108	123	102	123	105	97	89	87	1,147
Burleigh Pens	..	..	Do.	..	71	63	81	97	133	124	103	104	94	105	82	84	1,141
D. Fulton	..	..	Do.	..	82	86	125	115	124	110	112	83	91	77	81	46	1,132
W. H. Reilly	..	..	Chinese Langshans	..	21	95	114	126	119	129	115	91	82	82	87	60	1,121
J. A. Cornwell	..	..	Black Orpingtons	..	13	25	74	131	102	123	118	116	97	114	86	84	1,083
T. W. Leney	..	..	Do.	..	8	74	50	134	130	144	120	99	92	86	66	52	1,055
C. H. Singer	..	..	Do.	..	43	56	67	102	84	128	99	96	96	109	75	68	1,023
H. Puff	..	..	Rhode Island Reds	..	36	95	104	127	116	112	96	68	75	63	61	48	1,001
A. Gaydon	..	..	Black Orpingtons	..	..	3	72	127	115	126	109	90	92	102	75	74	985
H. Ashworth	..	..	Do.	..	13	40	37	93	127	131	108	111	84	101	74	60	979
T. B. Barber	..	..	Do.	..	12	82	82	103	121	119	112	68	76	59	71	38	943
Totals	..	..			4,187	5,355	5,704	7,946	8,824	8,986	8,758	7,635	7,128	6,837	5,758	5,043	82,161

RESULTS OF SINGLE HEN PENS.

	A.	B.	C.	D.	E.	F.	Total.
LIGHT BREEDS.							
T. Fanning (f)	269	254	267	287	266	284	1,627
J. M. Manson (f)	271	253	286	279	235	272	1,596
E. A. Smith	253	245	268	252	237	263	1,518
W. Hindes	260	258	256	225	228	250	1,477
Dr. Jennings (f)	246	221	236	231	217	280	1,431
G. W. Hindes	253	238	255	228	210	219	1,403
W. Becker	263	243	251	224	192	216	1,389
Haden Poultry Farm	257	240	233	216	176	223	1,345
Range Poultry Farm	207	234	243	240	200	211	1,335
B. Caswell (f)	178	171	213	256	289	215	1,322
Quinn's Post Poultry Farm	211	211	222	265	203	205	1,317
Dixie Egg Plant	203	222	235	202	217	236	1,315
C. P. Buchanan	178	255	188	221	218	240	1,300
H. Fraser	172	246	253	225	158	235	1,289
W. Lyell	204	232	238	198	210	186	1,268
L. G. Innes	149	247	170	210	245	213	1,234
J. J. Davies	213	220	218	177	193	206	1,227
Thos. Taylor	197	170	194	232	239	194	1,226
Mrs. A. G. Kurth	256	222	219	187	166	169	1,219
Mrs. L. F. Anderson	216	240	185	216	161	188	1,206
Mrs. R. Hunter	183	121	216	173	203	217	1,113
O. W. J. Whitman	179	222	161	163	200	186	1,111

HEAVY BREEDS.

R. Holmes (f)	274	272	299	242	317	215	1,619
E. F. Dennis	247	248	274	258	227	293	1,547
R. Burns (f)	270	224	246	335	247	219	1,541
E. M. Larsen	256	243	278	223	248	172	1,420
W. Smith	220	247	239	205	252	243	1,406
A. E. Walters	254	192	241	235	219	239	1,380
E. Morris	210	213	241	227	265	180	1,336
Kelvin Poultry Farm (f)	290	195	217	163	232	212	1,309
Mars Poultry Farm	198	249	246	185	170	223	1,271
T. Hindley	208	228	191	214	189	224	1,254
Jas. Ferguson (f)	210	278	171	175	206	193	1,233
Nobby Poultry Farm	175	191	179	196	231	251	1,223
A. Shanks	86	158	252	197	226	263	1,182
D. Fulton	172	193	187	170	191	219	1,132
W. H. Reilly	172	160	222	211	166	190	1,121
F. W. Leney	113	170	191	222	170	189	1,055
H. Puff	202	159	169	205	96	170	1,001
T. B. Barber	152	171	118	166	172	164	943

PRIZE MONEY.

— LIGHT BREEDS.

J. M. Manson, Yeronga—	£	s.	d.	£	s.	d.
Pen aggregate	First	3	3	0		
Single test aggregate	Second	2	2	0		
Winter test aggregate	First	3	3	0		
True to type aggregate	First	3	3	0		
					11	11 0
W. Hindes, Manly—						
Pen aggregate	Third	1	1	0		
Winter test aggregate	Second	2	2	0		
True to type aggregate	Third	1	1	0		
					4	4 0

PRIZE MONEY—*continued.*LIGHT BREEDS—*continued.*

LIGHT BREEDS— <i>Continued.</i>							£	s.	d.	£	s.	d.
E. A. Smith, Paddington—												
Pen aggregate	..	..	..	..	..	Second	..	2	2	0		
True to type aggregate			..	..	..	Second	..	2	2	0		
							<hr/>			4	4	0
B. Caswell, Riverview—Single hen aggregate							..	..		3	3	0
Dr. E. C. Jennings, Gatton—Single hen aggregate							..	..		1	1	0
Dixie Egg Plant—Newmarket Winter test aggregate							Third	..	..	1	1	0

HEAVY BREEDS.

R. Holmes, Toowoomba—												
Pen aggregate	..	..	..	..	First	..	3	3	0			
Single hen aggregate	..	..	..	..	Third	..	1	1	0			
Winter test aggregate	..	..	..	..	First	..	3	3	0			
True to type aggregate	..	..	..	..	First	..	3	3	0			
										10	10	0
R. Burns, Sladevale—												
Pen aggregate	..	..	..	..	Second	..	2	2	0			
Winter test aggregate	..	..	..	..	Second	..	2	2	0			
True to type aggregate	..	..	..	..	Second	..	2	2	0			
										6	6	0
Kelvin Poultry Farm, Kelvin Grove—Single hen aggregate						..	..			3	3	0
Jas. Ferguson, Kingaroy—Single hen aggregate						..	..			2	2	0
W. Smith, Brisbane—												
Pen aggregate	..	..	..	..	Third	..	1	1	0			
True to type aggregate	..	..	..	..	Third	..	1	1	0			
										2	2	0
A. E. Walters, Moorooka—Winter test aggregate						..	..			1	1	0
Total Prize Money..						..	..			£50	8	0

STATEMENT OF EXPENDITURE AND RECEIPTS.

<i>Expenditure.</i>								£	s.	d.	£	s.	d.
Prize money	..	..	..	..	..	..	..	..			50	8	0
Food—													
Wheat, 291½ bus.	..	..	..	..	..	..	..	97	5	5			
Pollard, 415 bus.	..	..	..	..	..	..	..	50	19	0			
Bran, 226½ bus.	..	..	..	..	..	..	..	23	13	10			
Cracked corn, 14½ bus.	..	..	..	..	..	..	..	6	6	8			
Meggitt's meal, 4 cwt.	..	..	..	..	..	..	..	7	16	3			
Dried blood, 5 cwt.	..	..	..	..	..	..	..	4	17	6			
Green lucerne, value of	..	..	..	..	..	..	..	2	0	0			
Soup meat, value of	..	..	..	..	..	..	..	3	0	0			
											195	18	8
Balance	..	..	..	..	..	..	..				413	16	5
											£660	3	1
<i>Receipts.</i>													
Entrance fees	..	..	..	..	..	..	..				88	10	0
Sales—													
Defence Department, 5,096 doz.	..	..	..	..	..	..	..	418	13	1			
College dining-hall, 1,750 9/12 doz.	..	..	..	..	..	..	..	153	0	0			
											571	13	1
											£660	3	1

A FAMILY'S EXPERIENCE IN POULTRY FARMING.

Many people are impressed with the idea that a good thing is to be made out of poultry-farming, and the result has been that, having started the business with no other experience than the running of a few hens of mixed breeds on the farm, these sanguine people have found, to their cost, that much more is required, to be successful in poultry-farming.

A short time ago we were given the experience of a family, whose hopes were raised by friends who pointed out the large profits to be made in this industry. On the principle that "a little nonsense now and then is relished by the wisest men," we give this to our poultry friends:—

Many years ago, we were strongly advised to go in for poultry-farming, being assured that a fortune was to be made in the business. We had a large area of ground in one of the suburbs of Brisbane, so we decided to enter on such a lucrative business. We erected the necessary poultry houses, purchased brooders, incubators, &c., and fenced in runs for the expected chickens. Then a number of expensive prize birds was obtained; and our first object was to raise birds for export, and in a short time we had about a hundred head of different breeds. One shipment was sent away per medium of the Department of Agriculture and Stock. In due time we received the account sales, which disclosed such a loss that we decided to give up all hope of making money by exporting birds to England, and therefore took the advice of an expert, as he was called, which was, to run fowls for show purposes and sell settings of prize eggs. But here, again, we met with disaster, for everybody had prize eggs and fowls for sale. So, after devoting any amount of time, trouble, and expense to this phase of the business, it proved a failure. We tried selling the eggs to the stores, but all they would offer us was 6d. a dozen for eggs the size of ducks' eggs.

Finally, we tried ducks and turkeys, but all proved a failure financially.

Having become thoroughly disillusioned with respect to poultry-farming, we sold and killed off most of the birds, sold the incubators, &c. As for the brooders, these came to a tragic end. No buyer could be found for them, so they were stacked in a cow shed. There again, Nemesis pursued us, for a cow was one day tied up near them, to be washed. This perverse animal took a dislike to the boy in charge of it, and after kicking and plunging, it half-killed the boy, then made a flying leap and landed on top of the brooders, and jumped about on them until they were reduced to kindling wood and lay in a mangled, dejected mass on the ground. Such was our experience of High Class Poultry Farming.

Moral:—*Ne sutor ultra crepidam.*

ABOUT MUSCOVY DUCKLINGS.

By R. T. G. CAREY, Muscovy Breeder, Beerwah, Queensland.

When the duckling breaks through its oval prison, or egg shell, which it does by pipping the large end of the egg shell in such a manner so as to remove it like a cap, off, it gives a struggle; and forth from the incasement it comes, and is neither pretty nor cunning, downy nor fluffy—not at first.

At the moment of birth, it is covered with what is apparently a layer of hairs—not with a covering of downy fluff. These hairs rapidly dry and begin to uncurl and unfurl themselves into what is termed down. That is the duckling's first garment for several weeks.

When they are hatched, Nature has supplied them with food of sufficient quantity and quality to last from three to four days. This source of supply is the "yolk" of the egg, which was absorbed by the duckling into the body just before hatching.

This yolk should be assimilated or thoroughly digested in thirty-six hours, otherwise digestive disorder will result.

In order to avoid those troubles, ducklings must not be fed until they are at least 48 hours old; after that period give them some sharp sand or fine grit, and cool water. A couple of hours later commence to feed them. You can safely give small chick grain or canary seeds, or a dry crumbly mash of wheat bran 1 oz., pollard 2 oz., moistened with sour milk. That is enough for mother duck and twelve ducklings per meal. Rolled oats are too large, but oatmeal sifted is better. Ducklings must be fed every two or three hours during the day until they are one week old.

Then the frequency of feeding should be reduced gradually until they need feeding only two or three times a day.

Good results may be obtained by feeding hard-boiled eggs, wet mash, Johnny-cakes, bread crumbs moistened with sweet or sour milk or a little beef-gravy, but those systems involve extra unnecessary labour. Just as good results can be obtained by the simple mash food and cracked fine grain, beef scraps, constant supply of clean fresh water, plenty of sharp grit and charcoal—then bowel or other intestinal trouble will not be so common as under the former old-fashioned, fussy style.

The dry mash should be kept before the ducklings at all times after they are four or five days old. When natural herbage is scarce, try lucerne, lettuce, chopped onions, sprouted oats, or any other green foliage, herbage grass, young cane tops, or tender maize stalks, &c.

During transit, day-old ducklings can carry very well and arrive in good condition where the journey occupies less than 100 hours from birth; therefore should you live within the radius of 400 or 500 miles from duck farmers, you could safely feel assured of receiving them alive and in excellent condition as if when removed from their mothers or incubators. Whether it be boat, rail, or coach routes, it is much safer to order day-old ducklings than eggs, whereas the ducklings are generally handled much more carefully and more gently than eggs.

When the ducklings arrive, have the brooder or place where they are proposed to be kept “ready” thoroughly clean—a good sand or dry earth floor, and have the brooder heated to about 75 or 80 degrees before placing them therein. Keep that heat up for about one week; then gradually run it down and dispense with it as soon as possible, as ducklings can maintain their own temperature and thrive.

The golden rule in feeding ducklings is, “more brains than grains.” More are killed by grains than by brains—that is, by over-kindness in feeding than under-feeding.

LOSS BETWEEN CUTTING AND MILLING CANE.

HIGHLY IMPORTANT FIGURES.

In Hawaii recently thirty sticks of uniform Yellow Caledonia were divided into ten samples, which were subsequently ground on successive days, the weight of each lot being also taken from day to day. The figures are shown in the table produced herewith:—

Age of Cane After Cutting, Days.	Weight of the Cane, Lb.	Weight Lost, Per Cent.	Analysis of the Juice.				Sugar Per 100 of Cane.	Sugar Lost Per Cent.
			Brix.	Polariza-tion.	Purity.	Quantity ratio.		
—	17½	—	21.7	18.78	86.54	7.11	14.065	—
1	17	—	21.8	20.07	92.06	6.44	15.527	—
2	16¾	1.38	22.30	19.75	88.56	6.68	14.763	5.57
3	16½	4.76	22.00	18.05	82.05	7.59	12.548	19.19
4	16¼	6.15	22.60	18.19	80.49	7.61	12.332	20.58
5	16½	4.48	25.50	17.06	75.82	8.40	11.371	26.77
6	16¼	4.00	22.70	16.02	70.57	9.36	10.256	33.95
7	16	6.15	22.70	16.44	72.42	8.97	10.463	32.61
8	15¾	10.29	23.30	17.50	75.06	8.24	10.887	29.88
9	15½	11.43	23.10	17.42	75.41	8.25	10.736	30.86

Other tests were carried out with D.1135, Lahaina, and H.109. In the case of Lahaina and H.109, for example, the increase in the tons of cane required to manufacture a ton of sugar after two, four, and six days was: 0.07, 0.11; 1.37, 0.43; and 3.48, 0.80 per cent. respectively for the two varieties. By combining the weight losses and the decline in quality, the loss of available sugar was calculated to be after two, four, and six days for the same two kinds of cane: 5.7, 2.8; 24.7, 12.2; and 41.4, 18.0 per cent. respectively.

The losses are really less than might actually obtain, as the same formula for expressing the quality ratio was used for fresh and old cane alike. It is obvious that the fibre per cent. would increase as the cane dried up; while if the actual polarisation per cent. had been determined in all cases, still higher losses would have been indicated. Moreover, not only is there a loss of sugar, but also a deterioration of the quality of the juice, making milling and boiling more difficult.—“South African Sugar Journal.”

The Orchard.

TAKING WATER OUT OF FRUIT.

In last month's Journal we published portion of an article on drying fruits, which appeared in the Brisbane "Daily Mail." The following is the concluding part of the subject:—

CHEAP TRANSPORT.

"Germany had three plants in 1898 and 1,900 in 1900, while 2,000 breweries were using part of their machinery for the drying of foodstuffs. She saw, as America had seen, that this process increases production by the saving of those foodstuffs that at present go to waste. By the elimination of unnecessary water it facilitates transportation. It is economical, because less money will purchase a greater quantity of food values. There has been much hunger in days gone by for the reason that supply could not be regulated to always satisfy demand. Earliest history records sun-drying as the means of food preservation. For a long period of time it was the only method; then canning happened. Canning has never been able to always satisfy demand.

"By means of dehydration only replaceable water is removed. It is taken from around the cells that contain the food substances. This means that the food substance, food materials, salts, and so forth contained in the products are concentrated. Nutritional food value is not depreciated. Flavour-giving compounds are preserved intact. In future many food products which have not in the past been exported owing to impossibility to transport in fresh condition will be available to the masses. It is estimated that about half of the fruits and vegetables grown for the market never reach the consumer. Dehydration will save a great proportion of the half which has been lost. Thus it will bring down the cost of living. One ship will convey the same amount of dehydrated foodstuffs as 10 ships will carry of refrigerated or fresh foodstuffs.

"WATER FROM THE TAP."

"A man who purchases canned products pays food value price for about 85 per cent. of water contained in the product, water in the syrup, and the transportation costs of the weight of that water, not to mention the tin can. The man who purchases dehydrated food pays for about 100 per cent. of food value at food value rates and no water transportation. The necessary water is supplied from the tap at water rates. If a cannery is operating in the same district as a dehydrator, the latter can treat all the products that the cannery may can, and, in addition, can dehydrate many products that a cannery cannot can.

"The sun-drying method is positively corrupt in comparison with modern dehydration methods. The sun has been practically eliminated from the divinity business, and when you use it to dry foodstuffs you leave the products in the sun where the dust and filth of the earth must collect on them. Not a particle of dust or dirt contaminates a dehydrated product. Which will the consumer of to-morrow prefer? Dehydrators will come here shortly, and will revolutionise the sale of foodstuffs. To soldiers growing fruits they will prove a blessing. Apples, peaches, apricots, tomatoes, pears, prunes, pineapples, cabbages, pumpkins, onions, celery, carrots, or any other thing the digger can grow can be dehydrated."

WHEAT PRICE FIXED.

The conference between representatives of the Commonwealth and the various States concluded its deliberations on 1st November last. With the exception of Western Australia, all the Premiers of the States, and the Prime Minister, were present. The conference decided to fix the price of wheat for home consumption at 9s. per bushel.

Tropical Industries.

PREMATURE ARROWING OF SUGAR-CANE.

ITS CAUSES AND EFFECTS.

By G. A. LABARTHE, in the Bulletin de l' Association des Chimistes de France.

The different opinions expressed on the causes of premature arrowing of cane are very diverse and contradictory. Some have explained the phenomenon by saying that reproduction by means of seedlings has determined little by little certain modifications in the formation of the flower organs destined by nature to ensure the reproduction of the species. This opinion is demonstrated by the fact that native canes that grow freely always arrow at the time of maturity; but this theory is contradicted by the fact that some plants that have reproduced through seedlings for centuries, such as the vine, have kept a normal flowering. The other two following theories are contradictory.

One says that insufficiency of soil food, lack of manure, and in general all circumstances that keep back the growing of the cane favour flowering. In consequence the canes should be fortified during summer by supplying nitrogen in a readily assimilable form such as nitrates dissolved in irrigation water.

The other theory contends that flowering is favoured by a strong vegetation and mostly through an excess of nitrogen in the soil, the consequent remedy being to use all possible means to check vegetation; no irrigation and less nitrogen.

But none of these theories explains the flowering of cane in the different circumstances in which it is met. Mr. Labarthe's observations were made on fields of 6,500 hectares in different climatic conditions and comprised soils of different compositions. These led him to consider that flowering was a consequence of a disproportion arising between the amount of moisture absorbed by the roots and that evaporated through the leaves. This causes the sap to ascend more slowly, and then nature tries to bring back the equilibrium by giving forth new organs of evaporation which at the same time assure the reproduction of the specimen.

So, accordingly, all reasons bringing about either too much absorption by the roots or not enough evaporation by the leaves will favour arrowing.

It is a well-known fact that water is issued in the state of steam or vapour from the leaves. This water that is produced by the protoplasm and the chlorophyll functions comes to the whole surface of the cuticle, but mostly through the stomata. But if at the beginning of summer the soil lacks water, and if to the effects of a high temperature are added that of the wind and sudden changes in the hygroscopic state of the atmosphere, then the cellulose cuticle gets thicker and the stomata diminishes in number and in efficiency, and evaporation becomes insufficient. The plant tries to get new organs of evaporation to make up for the old ones that are no longer sufficient.

When the plant is in that condition the planter generally tries to better it by irrigation. The results of this might be favourable or not according to the development of the roots. If they are too developed through a lack of nitrogen, then they absorb too much water and arrowing is hastened. If, on the contrary, the growth of the roots has been normal, the vegetation is normally resumed after a while.

So the observations of Mr. Labarthe have led him to the following conclusion. An excess of moisture in the soil favours arrowing, and the more developed are the roots and the less are the evaporating organs the quicker the phenomenon is produced.

As for the effects, the opinions are more at variance even than for those of the causes. Boname has observed that as soon as the flowers appear the sucrose content ceases going higher and the time of the crop is the same as it was before arrowing.

I. Venderghem comes to the same conclusion, remarking that it then contains more fibre and less juice.

From the personal observations of the author the arrowed canes give a juice of a lower sucrose content, contain more glucose while the crop diminishes in weight, while the percentage of juice also becomes less. The author concludes by giving the following advice:—Select a non-arrowing specie, plant nearer, use nitrogenous manure, drain excess of water.—Reprint from the "South African Sugar Journal."

COFFEE GROWING IN QUEENSLAND.

No. 1.

By T. A. BROMILEY, Instructor in Coffee Culture,
Department of Agriculture and Stock.

One of the multitude of economic crops Queensland has proved herself capable of producing to perfection is coffee. Years ago, under the guidance of an able instructor, M. H. Newport, it seemed likely that this crop would become one of our staple agricultural products. In the North a considerable aggregate area was planted; the trees bore abundantly in some cases, it is averred, as much as 15 cwt. of beans per acre were garnered under favourable conditions and good cultivation.

The average for years was 10 cwt. per acre. Such results have been frequently obtained in the southern parts of the State, indeed surpassed. After nearly thirty years of cultivation of coffee in Queensland, the writer has never seen any form of disease attack the trees. Notwithstanding these most favourable conditions, the acreage under coffee declined. This falling off was the result of several causes. Perhaps the universal planting of sugar-cane, and consequent diversion of labour to the canefields, had much to do with it in some districts, as coffee ripens about the time canecutting commences.

This dearth of labour would be acutely felt in the larger areas, and, as these conditions could not be altered, many fields went out of cultivation wholly, or in part, in consequence.

Another deterrent factor, for the small grower, at any rate, would be the lack of a marketing centre. Having, probably, no purchaser for his crop but the local storekeeper, who, in his turn, had only his restricted local market, could not but have a depressing effect, at least such conditions would not tend to the expansion of the coffee industry.

This state of affairs certainly obtained in the southern portion of Queensland. This disability the Minister of Agriculture will remove as far as possible by a plan to be mentioned later in this article.

The novelty of the crop to Queensland farmers, no doubt, led to many mistakes in the field and handling of the harvest.

Until a larger settled population occupies the central coast districts, this scarcity of labour will continue near the canefields.

But there are whole tracts of country far removed from the canefields, eminently suited to the production of coffee in both the northern and southern parts of the State. It is quite possible that this difficulty of inadequate supply of labour for harvesting may be overcome by a system of co-operation, but the cultivation of the crop at present cannot be undertaken in the way of large estates. It is, however, especially suited to the small grower, with several children to assist in picking time. The harvesting finished, the balance of the year's work upon an acre or two would be very light, and would take but a few days. The coffee tree is as easily grown as any other fruit tree, and with less trouble and expense than some, as, so far, it has shown no sign of disease, therefore spraying and washing are not necessary. No special cultivation is needed beyond such attention as a careful fruitgrower would give to his trees. The yield per tree averages higher than in some coffee-growing countries.

The labour of harvesting the crop—that is, the picking of the berries—is well within the power of juveniles of ten or twelve years of age. The shrub will grow well and bear abundantly in any moderately fertile land out of reach of severe frost and where there is an average yearly rainfall of, say, 38 inches. When the tree is established, it will stand spells of dry weather as well as any other crop we cultivate. Most newly opened scrub land, if undulating and naturally drained, is perfect for coffee, the yield abundant, and of high grade. But the shrub will accommodate itself to a greater range of soils and situations than some other fruit-bearing trees. The writer has seen it growing and cropping well on the sea-coast not more than a hundred yards from high water, and only 50 or 60 ft. above it, the soil being blady grass forest. In another district a few trees doing well in coarse, gritty, river drift. Of course, such soils and situations as these latter are not recommended, and are only mentioned to show the farmer, or others who would try coffee growing, that the land they have will answer, subject to the conditions of freedom from frost and with a fair rainfall. Light frost, if not too long continued, will not hurt the tree.

It will thus be seen it is not a question of “Will coffee grow in Queensland?” nor of “Will it yield profitable crops?” Those questions have long since been answered in the affirmative.

Not only does it bear heavily and regularly, but its product has been classed in London as amongst the world's best.

Latest figures of imports into the Commonwealth show that 2,605,240 lb. of coffee came in from overseas. Queensland ought to capture the bulk of that trade. It can, and must, be done. The state of our national finances demands that we send not one shilling away for what we can, with a little Government assistance to help over several initial difficulties, produce at home. What, it may be asked, is the nature of these difficulties? Can they be surmounted? With regard to the first question, reference to what has been written in the former part of these notes will show that they may be summed up under three heads. First, shortage of labour in some districts for harvest work. Second, need for a market at some central point where merchants and others might see that a first-class article can be produced in quantity in Queensland at a price, quality considered, almost, if not quite as cheaply, as from other parts of the world. The third obstacle is a minor one; still, it is an obstacle, but easily overcome.

With regard to the first, it is suggested that farmers, soldier settlers, and others following rural pursuits plant a patch as an auxiliary to their incomes. A few hundred trees, up to an acre or two, could be easily tended, as has been intimated above, and the remuneration, as will be shown later, very encouraging.

As a cover for poultry, a field of coffee has no equal. By the way, this feature might receive the attention of those engaged in poultry-raising in the warmer parts of the State. Light dressings from the fowl-yard would keep the trees in splendid health and ensure maximum yields. The shade of the trees would do the same for the fowls. Then co-operation in the treatment of the berries, that is the "pulping"—taking off the red outer skin by means of a small machine called a "pulper"—followed by fermenting, washing, and drying.

In any co-operative effort it may be assumed the Government would assist.

The second condition has received serious consideration by the Honourable the Minister of Agriculture, who has taken steps to meet it by establishing the system so successful in cotton production—namely, to make advances upon coffee in "parchment" consigned to the Under Secretary for further treatment, that is, "hulling" or "peeling"—removing the inner or "parchment" skin—grading, and marketing. By this means the grower is relieved of the most difficult part of the work of preparing the beans for market; and, what is of paramount importance to the grower, his coffee will thus be placed under the immediate notice of bulk buyers. The amount of advance the Minister proposes to make is 7d. per lb. for properly prepared, clean parchment. Reckoning the yield per acre at 1,000 lb., a not at all extravagant estimate, the gross return would be £29 3s. 4d. The finished beans should be worth not less than 1s. per lb., which would be £50; but from this sum must be deducted the loss of weight of parchment skin, about 18 per cent., and the cost of hulling, which two items together would aggregate about £13 10s. This deducted from £50 would, of course, leave the net amount of £36 10s. These calculations are based on pre-war prices. At present, higher rates prevail. Last year, 1919, the writer offered for parchment coffee 1s. per lb. for a ton or more; the offer was rejected. He bought cleaned coffee at 1s. 5d. per lb., freight on. These prices may hold for some time, or they may not. But the prices mentioned above will continue, with the possibility of an advance. The trifling difficulty of unfamiliarity with coffee production by agriculturists, Mr. Gillies has adopted means to remove by the appointment of a Queensland coffee grower of many years experience in all branches of the business to the position of instructor and inspector in coffee production. It is expected, when this gentleman shall have visited the farmers in such parts of the State as are climatically suited to the coffee crop, all difficulties and uncertainties will have disappeared.

THE CENTRAL SUGAR DISTRICTS.

The General Superintendent of the Bureau of Sugar Experiment Stations has received the following report from the Field Assistant, Mr. J. C. Murray:—

During the month the following cane areas have been visited:—Woongarra, Barolin, Kalkie, Avondale, Millbank, Sharon, Gooburrum, and Bucca.

With regard to the sub-areas of Bundaberg, taking Woongarra, Kalkie, and Barolin firstly, there is a marked increase in the prospect for next year compared with the last time of visiting. The autumn planting is looking well, and more recently planted cane has struck nicely, and with occasional showers should make good growth now that winter and the likelihood of frosts have passed. Cutting is in full swing at present, and any cultivation necessary is in abeyance till this is over.

This usually trying portion of the season seems to be progressing favourably, with an abundance of suitable labour and very little labour trouble.

A noticeable feature of the cane on these areas this year is the increase of the sugar-cane moth borer. The presence of this parasite accounts, no doubt, largely for the fluctuations in the returns for cane that the farmers receive from the mill. Not only is there a loss with regard to the commercial cane sugar that would be in infested cane, but when the borer is present there are other factors operating against the success of the crop, and which are incidental to the presence of the moth.

It is noticeable in places on the Woongarra that in a number of cases the borer has attacked the eyes of the plant cane, and left it very weak and stunted. This cane will probably do no good at all.

In other cases fungous diseases have collected on the holes, and the weakened cane has been knocked over by the wind.

Careful watch should be kept in unaffected fields, and if a stick of cane shows that it has been bored, it would be as well to cut it down and burn the stick before the borers have time to emerge.

Lime is badly wanted on these areas at present, as the average reaction of the soil shows a slight increase in the amount of acidity.

Burning cane is being practised considerably before cutting, an excellent arrangement for the cutter, but one by which the farmer runs a number of risks.

With regard to varieties, it is noticeable that those making most progress are probably H.Q. 426, Badila, D. 1135, M.S. 1900, H.Q. 285, N.G. 114, Black Innis, and H.Q. 813. Most of these canes are affected by the borer, although Clark's Seedling seems to suffer most. Badila is attacked badly in places.

On the other Bundaberg areas—Millbank, Gooburrum, and Sharon—matters are very much the same as at the time of last visiting, with the exception that the plant cane, principally D. 1135, is more forward and looks well for next season. Cutting is in full swing, and will occupy a few weeks yet. A small crop only is being taken off, but, with ordinary luck, next season should be a very fair one. Many of the farmers on these areas are indulging in mixed farming, growing only a small quantity of cane, although the recent rise in the price of sugar has been a great incentive to many growers to plant more than they originally intended to.

The moth borer is rampant on these areas as well as those previously mentioned east of Bundaberg. The previous remarks made apply to the western fields as well. There is a real danger in this menace to sugar-cane, and only by strenuous and careful efforts can the farmers check the pest.

Rain is again badly wanted; in fact, for conditions to be ideal, it wants at least an inch a week. Lime is still a great need, a factor which the farmers are well aware of, but prevented from getting adequate supplies owing to high initial cost.

Avondale farmers are busy cutting at present, consequently farming operations are for a week or so at a standstill.

On the plantation the outlook is good, and the company are well satisfied with their crop this year, all things considered. Still, Yuban cane is not a variety that commends itself to the small farmer, principally owing to the objection the cutter has to it. It certainly makes a good showing, and on the plantation a cut is expected of about 24 tons per acre. This is fair, considering the past season.

The borer is also in evidence at Avondale, although not so much as at Bundaberg. Great care should be taken by the farmers in the selection of the plants here, if they wish to keep a check on the moth, as plants coming from an infected area would almost be certain (if not carefully examined before planting) to contain a borer here and there.

The soil here is in good condition, except for showing slightly acid in some places and stronger in others. This land would grow cane splendidly if a good water supply was insured. As it is, too often the farmers fail, through not their own faults but by the fickleness of Nature.

With regard to cane growing at Bucca, much more planting is being done than previously, and the farmers are cheerful about their prospects. Cutting is going ahead at present, and the growers have a long way to transport their cane, but, nothing daunted, they are overcoming their difficulties gradually.

Lime is still a prime necessity for the soil, also green manures to restore humus and conserve moisture.

With regard to pests, the borer is in evidence, although not badly. Here, as well, careful selection of plants and observation of unaffected cane will help largely to stop its ravages.

Touching on varieties, D. 1135 seems to be the most payable variety at present, although it is probable that some of the later raised Queensland seedlings, such as H.Q. 855 or 813, should do well here.

REPORT ON CANEFIELDS IN THE CENTRAL DISTRICTS.

The General Superintendent of the Bureau of Sugar Experiment Stations has received the following report from the Field Assistant, Mr. J. C. Murray:—

GIN GIN AND MAROONDAN.

Growers on these areas were, at the time of inspecting, anxiously on the lookout for rain. Since then, however, a considerable amount of wet weather has prevailed, which should greatly improve the growing cane and enhance the prospects for next year.

In spite of the fact that weather conditions during the last ten months have been very trying, the farmers have managed to do a good deal of planting and cultivating. The farms present a pleasing aspect, being free from weeds and other signs of deterioration that occur if land is neglected. The staple varieties continue to be D. 1135 and 1900 Seedling, mostly the former. There are others growing, but none are doing sufficiently well to justify the growers displacing the Demarara. Remarks made in previous reports on varieties of Gin Gin may still be applied.

Not a great deal of trouble is being experienced with cane pests. The sugar cane moth borer is in evidence on some farms, although not in sufficient numbers to cause much damage. It is probable that this parasite is largely kept in check by a very voracious black ant, which enters the holes and destroys the borer. On farms where there are none of these ants, and the borer is present, it would be a good idea if the farmers were to introduce them.

Root nematodes attack any cane that is poor and not well grown, but it is probable that with good weather conditions and dressings of lime, the nematodes would disappear.

Growers should be very careful in the selection of plants; none but the best and healthiest cane available should be planted, and care should be taken to see that no plant is bored when placed in the ground.

At Maroondan the dry weather was still holding, although since then good rains have fallen. The heavy black soil was taking a lot of breaking up, but still, all things considered, the farmers appeared to have done very well.

In soils of the type that prevail around Maroondan, much cultivation is very essential. The grower who can lime liberally is on the right track here. With regard to cane pests, the same remarks can apply here as west of Gin Gin. Weeds are a source of trouble to the grower, *Sida retusa* growing to a considerable size, with an enormous root.

1900 Seedling and D. 1135 are the staple canes here, finding favour with the grower in the order named. A gratifying feature about cane grown on this area is that the yield of c.c.s. is generally higher than the average.

Remarks made previously on careful selection of plants would also apply here.

BINGERA.

From observations made, conditions at Bingera appear to be very satisfactory. The plant cane is coming along well, and now that the growers have been visited with such good rain, the prospects for next year should be better than they have been for quite a long time. D. 1135 is the staple growing, both on the plantation and farms, although some of the older canes, such as Cheribon, are giving satisfactory results to some growers. Cane pests are giving very little trouble, although the grub carries on his usual ravages on a small scale.

Noxious weeds are well under hand, and farmers generally, including the plantation management, are to be congratulated on the fine appearance of their cultivation.

CHILDERS.

The plant crop was looking well here at the time of visiting, and since then some six inches of rain have fallen, which give the district a very fair chance of a big crop next year. There is a bigger area under plant cane than has been the case for some time, the farmers previous to the last planting having determined to get a fair start with renewed cultivation, and a thorough cleaning up of the rubbish that bad seasons had left.

This was badly wanted, as checked and badly growing cane had become a refuge for cane parasites in the latter part of last year, and in many cases the fire stick was the best thing that could be recommended. However, now the cleanliness is striking, and, with the exception of small areas attacked by grubs and borers, the cane is free from parasitic trouble.

Again, as remarked before, if the clean and well kept appearance is to continue, the careful selection of cane plants must have careful consideration, and growers should be cautious not to select cane from areas that are attacked by parasites, or cane that is suffering a reversion in type. If the growers wish to keep the present staple varieties up to standard, these matters should be carefully observed. With regard to varieties, there is nothing new to mention since previously visiting Childers. D. 1135 and 1900 are still the principal varieties. Q. 855 would probably justify planting on these areas, also Q. 813. If frosts have occurred at Childers this winter, they have been light, as the cane shows no sign of having been touched. Much of this year's cutting is poor quality and high in fibre, but this is not to be wondered at, considering the disadvantages the farmers have been labouring under.

Cutters are not as careful in trashing as they might be. The topping in a number of cases is unsatisfactory. This is hard on the grower whose cut is only small, and anything that prevents him from getting the best return possible tends to have a discouraging effect in these hard times. Lime would be a distinct advantage on most of the Childers farms, and arsenic could be tried in small quantities when the grub is bad. Green manuring is to be recommended.

MARYBOROUGH.

Conditions at the time of visiting had not altered much since the previous inspection. Most of the cane is grown as a by-product, farmers finding, in view of the high price of legumes, &c., that it is more profitable to grow these commodities. However, what cane there is planted looks well, and since good rains have fallen, which should give the mill something to do above normal next year. Many of the older varieties find favour around Maryborough, such as Striped Singapore, and it is likely that, seeing from these the land has had a spell for ten or fifteen years, it might pay to reintroduce those which have a good sugar content and suffer from no specific disease. From tests taken of the soil, the use of lime is to be recommended at present, also the use of vegetable manures.

During the inspection of the Maryborough district a visit was made to Mr. Braddock's property at Turkey Island, at the mouth of the Mary River. This island has about 500 acres fit for cultivation, if cleared and drained. The soil is a sandy loam, and is at present covered with short, fairly straight timber, consisting of bloodwood, titree, and bluegum. There is an undergrowth of jungle vines and lantana. It is a proposition that wants taking energetically, and clearing and ploughing, as well as draining in places.

If this is done, good crops will result. Through the courtesy of Mr. Braddock, a day was spent on the island, and no doubt the proposition is a good one if the owners decide to go on with it. At present a small area has been noted and planted in more or less of an experimental measure. The varieties growing are D. 1135, 1900, and Black Innis. It is probable that Badila would grow there, as well as some of the later Queensland Seedlings, such as 813 or 855.

The island is free from frosts, and will further produce bananas, oats, legumes, cabbages, &c.

MOUNT BAUPLE.

Owing to rain some time was lost at Mount Bauple. From what could be observed, however, the prospects are good for next season, and a considerable quantity of cane is being crushed at the mill. Some that is at present going through is high in fibre, although most of the cane is giving fair returns of c.e.s., especially 1900 Seedling. The moth borer is in evidence, and may probably account for the difference in sugar content that often puzzles the farmer. The general appearance of the Mount Bauple area is much better than previously seen, all vegetation having a healthy green colour, the young cane looking especially bright after the rain.

Crushing has gone with a swing, no troubles, except of a minor nature, having been experienced.

PIALBA.

This district was showing the effect of the recent rains, and there is a feeling amongst the growers that next year will be a good one. Of late, the weather conditions here have been anything but encouraging, and the ground, prior to the wet weather, was very hard. However, the farms now present a well-cared-for aspect, and other crops besides cane look well, particularly the bananas out the mountain way, a product that many farmers are raising in connection with sugar-cane.

The staple variety here is the D. 1135, although some growers are getting good results from H.Q. 285 and Rappoe.

Not much time was available at Pialba, but the farmers that were seen expressed a keen interest in the work of fertilisation and the taking of soil samples for analysis, also information relative to variety propagation and experiment.

Lime would be of the greatest benefit to Pialba growers, also, if possible, planting with green crops for the purpose of rotation and ploughing in. Operations such as these are calculated to restore nitrogen and give greater body to soils, thus

adding to their drought-resisting properties. Cane pests the farmers are fairly free of, although it would be advisable to burn off useless cane that has died from various causes, and is noticeable here and there. The patches of rubbish harbour parasites, and a fire is a very effective method with regard to these.

Cutting operations passed off without any trouble, and the cane cut, although fairly high in fibre, is yielding a fair sugar content.

YERRA.

More planting is being done here than previously, and should the farmers have any luck, a fair tonnage next year will come from this place.

Most of the people here grow just a small quantity of cane in connection with other pursuits, although Mr. Fielding expects to have about 25 acres planted shortly. This gentleman is taking in more land from the scrub, and, judging by the class of soil cleared, good crops should be grown. There is a fair amount of scrub land around suitable for cane, although some of the more low-lying portions are badly frosted. The great drawback is that the country is hilly, and even if farmers only have to cart a short distance, haulage gets very irksome. Still, this is a good district, with abundance of rich forest loam awaiting to be cleared. As previously remarked, lack of good roads is the great drawback. No doubt this will be remedied in a few years.

THE EARLY SUGAR MILLS OF QUEENSLAND.

In the early days of sugar-growing in Queensland there was no such thing as the modern sugar mill. One form of mill consisted of three upright rollers, about 2 ft. high and 15 or 18 in. in diameter. Some of these rollers were driven by four horses walking round a circular horse path and harnessed to each end of a beam to which one of the rollers was attached. The work was very heavy, and at least eight horses were required for relief. The "battery" consisted of two oblong pans into which the juice from the rollers was led. There it was clarified by liming, on attaining a heat of about 140 deg. F. From these clarifiers the juice was led by pipes to two lower pans called subsiders. There the scum was removed by large perforated ladles, and then the juice went to the first pan (the green pan of the battery). There were four large square pans, and one circular one called "the tache." In the first four the juice was frequently skimmed while boiling, a roaring fire being maintained in the furnace beneath them. On arrival at the tache, the juice was bucketed into it, and it was boiled until it bubbled like porridge. At this stage, a circular bucket with a valve at the bottom, was lowered into the tache, and conveyed the contents to the wooden coolers, where it was left to granulate. This process was repeated as fast as the tache was refilled from the pans. Should the sugar boiler not be careful to note the appearance of the concentrated juice when boiling in the tache, the result would be that instead of granulating, in the coolers, a sticky slimy mass would be produced which went by the name of "sling," without any granulated sugar.

To give an idea of the amount of work which such a mill would do daily, the writer, who erected one on his plantation, "Ormeau," Pimpama, about the year 1869, was well pleased if 1,800 gallons of juice were obtained from a day's crushing. The average was about 800 gallons, and it took about 20 tons of cane to make one ton of sugar.

Some growers drained their sugar in wooden bins, the bottoms of which were perforated with numerous holes, into each one of which a stick of banana stalk was stuck. This was a terribly slow process, and the resulting sugar still held a certain amount of molasses, which in course of transit, oozed through the mats in which the sugar was in those days marketed. One mill owner, having read up the "claying" of sugar in the West Indies, placed a layer of some kind of white clay on top of the sugar in the bins, and freely watered it. To some extent, this watering washed away the molasses from the sugar, which then had a dull, gray appearance, but was saleable at a slightly higher figure than the dark, brown "Muscovado." Later on, centrifugals, Bauer-pans, and Wetzel pans were introduced, into which the steam passed through coils. Triple effects and vacuum pans had not then arrived. The cost of such a mill as I have described was about £200, and the crushing power was so weak that juice could be squeezed out of canes which had been passed through the rollers. And to conclude, how were the canes passed through? A man sat on the bedplate of the mill and fed the canes one by one. If three canes, or even two of extra thickness should attempt to pass together, the mill stopped. The number of hands required to work this primitive machine was a horse-driver, two cane carters, a sugar boiler, four men skimming the pans, one man at the final tache, one man working the crane, one fireman, one man at the subsiders, one man to feed the mill—a total of thirteen all told. When the centrifugals were installed in 1868 and an engine took the place of horses, two mechanics were needed.



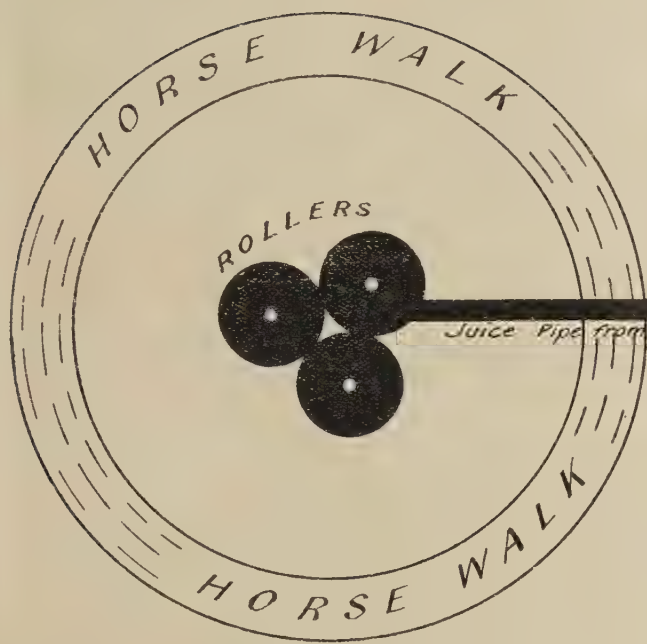
PLATE 21.

MAJOR A. J. BOYD'S SUGAR MILL AND BOILING HOUSE, "ORMEAU," PIMPAMA, 1869.

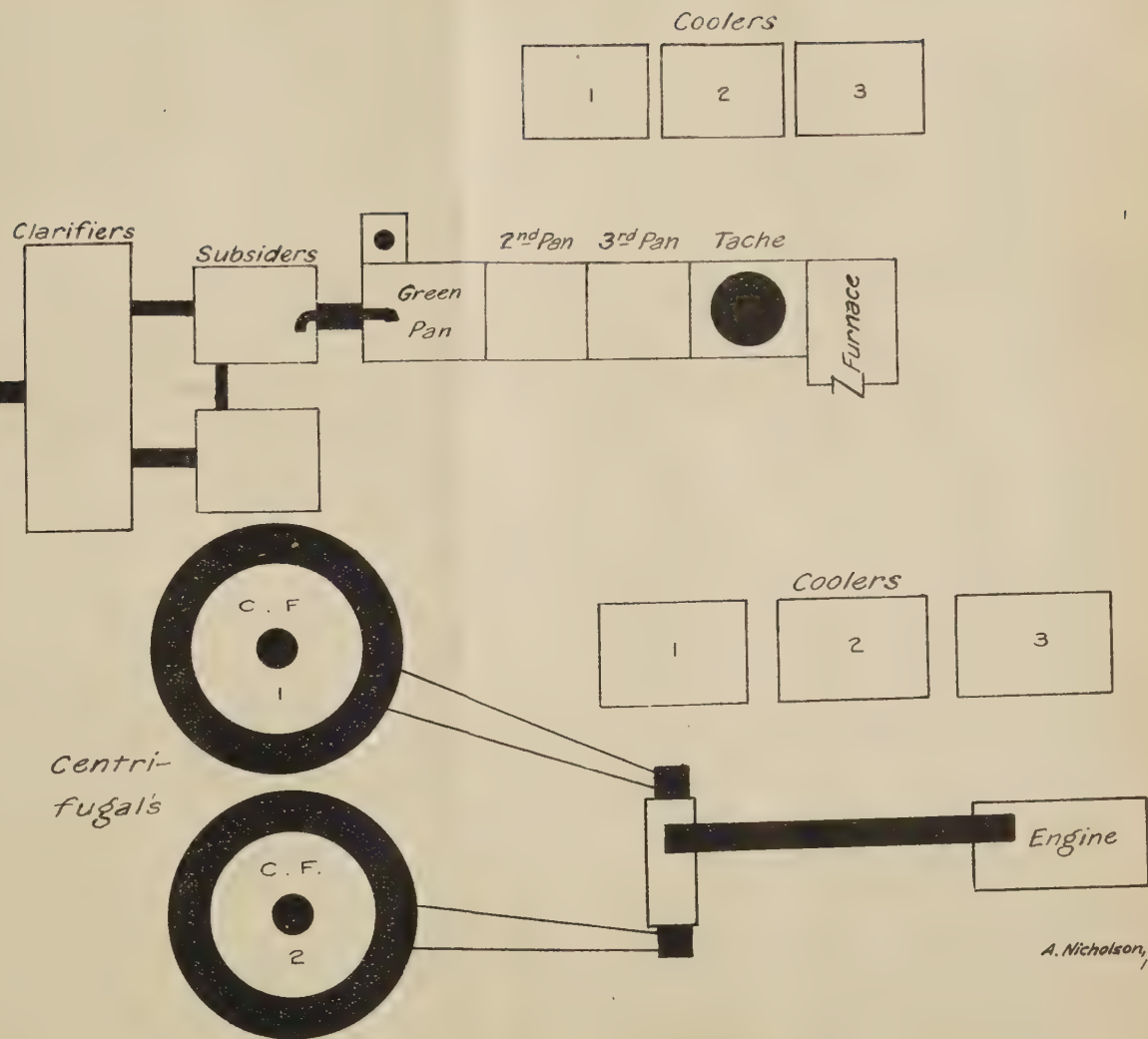


PLATE 22.

THE HOUSE AND GARDEN AND CANE NURSERY.



GROUND PLAN
of "Ormeau" Sugar Mill
Pimpama.



A. Nicholson, del.
1920.

Botany.

ON TWO SPECIES OF KURRAJONG (BRACHYCHITON) OCCURRING IN QUEENSLAND.

By C. T. WHITE, F.L.S., Government Botanist.

From time to time specimens of a tree have been sent to the Department for identification from North Queensland. This has been variously identified by the Botanical Division as *Brachychiton diversifolium* (*syn.* *Sterculia caudata*) or a Northern form of the common Kurrajong *Brachychiton populneum* (*syn.* *Sterculia diversifolia*). The material in all cases has, unfortunately, from a botanical point of view, been rather scrappy. On looking closely through it, however, I have come to the opinion that all the material from the more tropical parts placed under *B. populneum* in our herbarium collections belongs to *B. diversifolium*.

The following account has been prepared primarily with the object of drawing attention to the differences between the two trees; the illustrations should make these quite clear, and further specimens of either, bearing leaves and flowers, or fruits, would be much appreciated from any North Queensland or Northern Territory readers.

Note on the Genus Brachychiton.—*Brachychiton* is a genus of plants confined to Australia, and includes such well-known species as the Kurrajong, Flame Tree, and Bottle Trees. Benthams, in the "Flora Australiensis," did not recognise it as a separate genus, but classed it only as a section of the very large genus *Sterculia*, the species of which to the number of about 100 are widely distributed over the tropics and subtropics of the old world. In this view he was followed by Bailey in the "Queensland Flora."

Brachychiton was founded as a distinct genus by Schott and Endlicher in 1832, and is now held by most modern botanists to be sufficiently well marked from *Sterculia* to retain full generic rank. It is readily distinguishable by the seeds having a loose, brittle outer skin (testa) covered with hairs usually of a bristle-like nature; this outer coating of the seed is more or less adhesive to the inner face of the capsule or seed-vessel, so that when this outer skin breaks the seeds fall out in their inner testa only, leaving a number of empty shells inside the capsule presenting a honeycomb appearance. The inner face of the capsule is also covered with a thick fur or bristle-like coating of hairs, usually very dense and short.

In *Sterculia* the outer skin of the seed is quite smooth and falls away with the seed; only one species of the genus *Sterculia* as thus outlined is found in Queensland—viz., *S. quadrifida*.

COMMON KURRAJONG.

(*BRACHYCHITON POPULNEUM*).

References.—*Brachychiton populneum*, R.Br., in "Benn. Pl. Jav. Rar," 234; F. v. Mueller, "Plants of Victoria," I. 156, *Suppl. tab.* 5; Maiden, "Forest Flora of New South Wales," VII. 77-83, *tab.* 236; *Sterculia diversifolia*, G. Don., *Gen. Syst.* I. 516; Benthams, "Fl. Austr.," I. 229; F. M. Bailey, "Queensland Flora," I. 139.

Description.—A tree 20-60 ft. high. Leaves glossy-green, glabrous, long-stalked, very variable in shape, varying from ovate to ovate-lanceolate or more or less deeply 2-5 lobed, 2-3 in. long, the leaves or their lobes ending in long points. Flowers borne in axillary panicles, broadly campanulate, closely and densely or sparsely hairy outside, up to nine lines across, but usually smaller. Seed capsules 1½-3 in.



PLATE 24.—COMMON KURRAJONG (*Brachychiton populneum*).

1, 2, and 3. Flowering branch and leaves (Eidsvold—Dr. T. L. Bancroft).

4. Seed vessels, *s* the long slender stipes; all reduced to the same scale.

Analytical details:—(*a*) flower; (*b*) male flower in section; (*c*) female flower in section; (*d*) staminal column; (*e*) pistil with a ring of abortive anthers at the base; (*f*) seed enclosed in its outer brittle covering; (*g*) seed; (*d*) and (*e*) enlarged, the rest natural size.

long, the valves thick and woody, borne on a long slender stalk or stipes. Seeds with the outer covering about $\frac{1}{2}$ in. long, outer coating thin and brittle, bright yellow, clothed in the lower part with bristle-like hairs, inner coating dark brown or black but covered with a very close yellow somewhat waxy tomentum.

Distribution.—Widely distributed in Queensland; it is common in the forest country on the ranges of the south-eastern parts, such as Taylor's and Enoggera Ranges about Brisbane, Main Range, Bunya Mountains, Mistake Mountains, &c. It is very abundant in the Wide Bay, Burnett, Dawson, and Port Curtis districts. Our westernmost, and at the same time northernmost, locality represented in the Queensland Herbarium is Aramac (coll. C. W. De Burgh Birch), and specimens from localities further north or west would be much appreciated.

Besides Queensland it is found in New South Wales and Victoria.

Uses.—It is one of the principal fodder trees of Australia. It is largely grown, especially in the southern States, as an ornamental tree. The seeds have been used as a substitute for coffee. The young shoots, roots, and seeds were all used as food by the aborigines. The bark produces a strong fibre.

NORTH AUSTRALIAN KURRAJONG.

(*BRACHYCHITON DIVERSIFOLIUM*).

References.—*Brachychiton diversifolium* R. Br. in "Benn. Pl. Jav. Rar.," 234; Ewart and Davies "Flora of the Northern Territory," 192; *Sterculia caudata*, Heward; Benthams, "Flora Australiensis," I., 230; F. M. Bailey, "Queensland Flora," I., 139.

Description.—A tree, leaves glabrous, long stalked (except some of those on the barren shoots or coppice and seedling growths), variable in shape, usually ovate-cordate, but sometimes lanceolate, broadly linear, ovate or ovate-lanceolate, $2\frac{1}{2}$ -6 in. long. Flowers very velvety, pubescent or closely tomentose outside, borne in short axillary panicles, 5-7 lines across when fully out. Seed vessel almost sessile, or borne on a stipes not exceeding $\frac{1}{2}$ in. long, 3-4 in. long, the valves hard and woody. Seeds with the outer covering $\frac{1}{2}$ in. long; outer coat or testa loose, brittle, yellow and covered in the lower part with bristle-like hairs; inner coat or testa dark brown or blackish, but covered with a dense close yellow somewhat waxy tomentum.

Distribution.—This tree is apparently fairly common in North Queensland in the Cape York Peninsula and a little to the south. It also occurs in the Northern Territory and the northernmost parts of West Australia.

Specific Queensland localities for it in the Queensland Herbarium are:—Carbeen, near Mareeba (J. F. Keane); Stannary Hills (Dr. T. L. Bancroft); Cumberland (J. Williamson); Palmer River (Dr. W. E. Roth); Princess Charlotte Bay (Dr. W. E. Roth); Coen River (Mrs. R. W. Garraway).

Judging from our flowering specimens it would appear that the tree is dioecious—i.e., male and female flowers borne on distinct trees, but this could only be settled by an examination of numerous trees and their flowers.

Uses.—In "North Queensland Ethnography," Bulletin No. 3 (Brisbane 1901), Dr. W. E. Roth states that the fruits (seed vessels) are roasted and eaten by the natives. In Bulletin No. 7 (Brisbane, 1904), he states that on the Palmer River dilly bags are woven from fibre obtained from the bark. (He refers to it as the common southern tree, but I have seen his specimens, and they undoubtedly belong more to *B. diversifolium*). It would, no doubt, have similar value as a fodder tree as the common Kurrajong of Central and Southern Queensland, of New South Wales, and Victoria.

Main Distinctions Between the Two Species.—The differences between the two species can be put briefly, as follows:—

B. populneum (Common Kurrajong): Leaves entire or deeply lobed. Flowers almost glabrous or densely and closely tomentose outside. Staminal column quite glabrous. Follicles (seed vessels) $1\frac{1}{2}$ -3 in. long, on a long slender stipes or foot-stalk up to $3\frac{1}{2}$ in. long, but usually somewhat shorter.

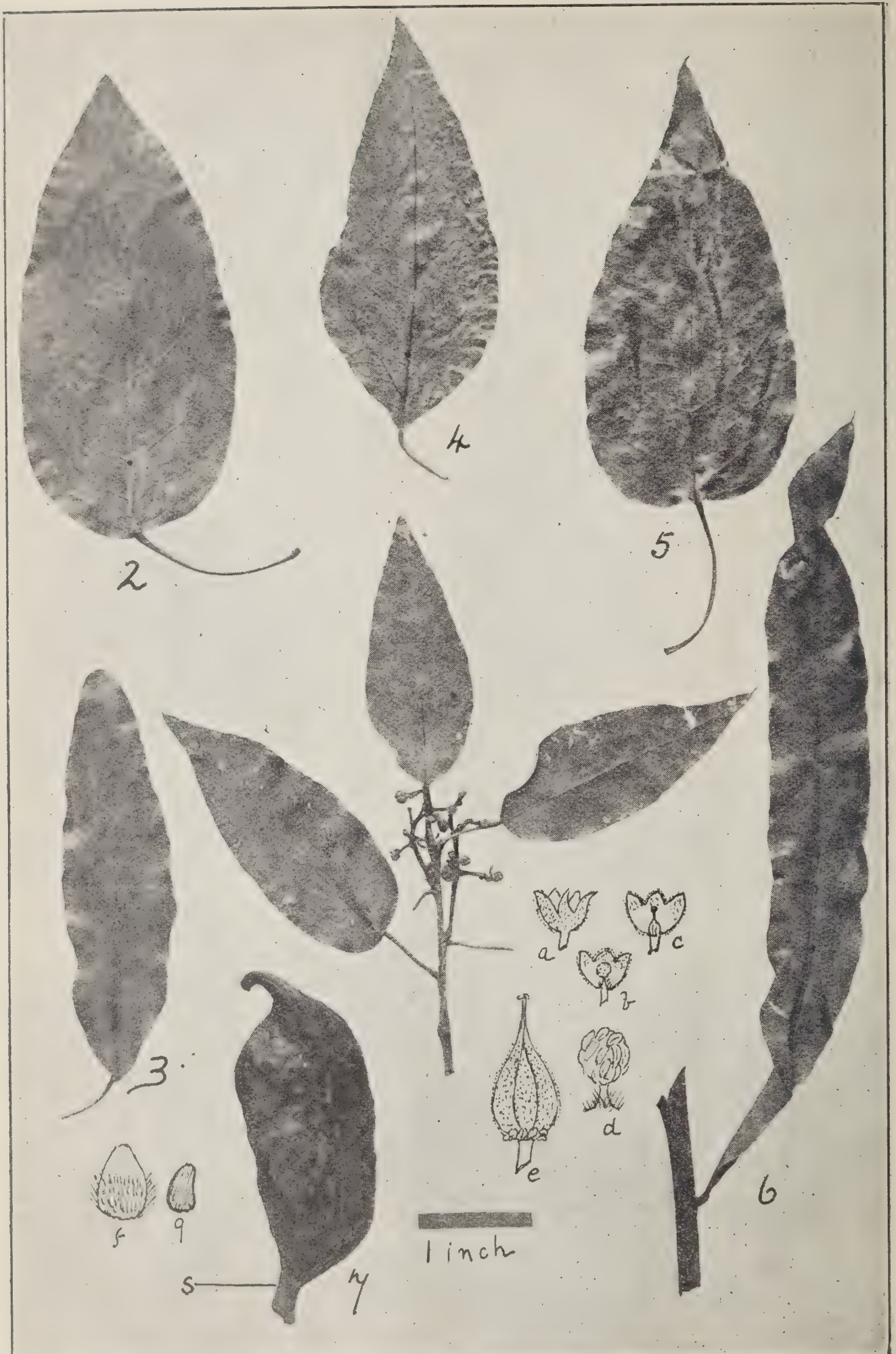


PLATE 25.—NORTH AUSTRALIAN KURRAJONG (*Brachychiton diversifolium*).

1. Flowering branchlet (Stannary Hills). 2. and 3. Leaves (Carbeen, near Mareeba). 4. Leaf (Cumberland). 5. Leaf (Princess Charlotte Bay). 6. Leaf from coppice growth (Palmer River). 7. Seed vessel, s. the short stout stipels. All reduced to the same scale.

Analytical details—(a) flower; (b) male flower in section; (c) female flower in section; (d) staminal column; (e) pistil; (f) seed enclosed in its outer coat; (g) seed; (d and e) enlarged; the rest, natural size.

B. diversifolium (North Australian Kurrajong): Leaves entire. Flowers densely and closely tomentose outside. Staminal column hairy at the base. Follicles (seed vessels) 3-4 in. long, almost sessile or on a stipes not exceeding $\frac{1}{2}$ in.

NOTE.—Ewart and Davies in "The Flora of the Northern Territory," p. 192, record *B. populneum* from several localities in the Northern Territory, and Maiden, in his "Forest Flora of New South Wales," vol. VII., page 82, records it from the Stewart River, in the Cape York Peninsula, Northern Queensland. It is quite possible, however, that the two trees here dealt with have been confused in the National Herbaria of Melbourne and Sydney, as they have been in Brisbane in the past, and that these tropical specimens are referable to *B. diversifolium*, which stretches, practically speaking, across the whole of Northern Australia.

Ewart and Davies l.c. give the vernacular name of *B. diversifolium* in the Northern Territory as "Flame Tree." Where the application of this name comes in it is hard to say; its use for this species is to be strongly discouraged, as the vernacular is almost universally applied in Australia to *B. acerifolium*, a native of the rich coastal "scrubs" or "brushes" of Queensland and New South Wales. This latter species is called "Flame Tree" on account of its bright scarlet or blood-red flowers, which it produces in great profusion from November to January.

INQUIRY RE SUITABILITY OF BLACK BEAN SEEDS FOR STOCK FOOD.

In reply to a correspondent, Mr. C. T. White, F.L.S., Government Botanist, writes:—

The large brown seeds of the Black Bean, Bean tree or Moreton Bay Chestnut (*Castanospermum australe*) are not suitable for stock food. When eaten by stock in any quantity they cause severe griping and often death, due to the presence in the seed of a poisonous saponin.

It is true the natives used them as food in the early days, but went to considerable trouble to rid the seeds of the poisonous principle; they were first baked or steamed, then finely grated, placed in dilly bags, and left in a swiftly running stream for about forty-eight hours before eating.

Considering the risk of using them, however, it would be hardly worth the trouble of thus preparing them for stock food, as there is even then, especially with an animal like the pig, a fair chance of them proving harmful.

THE PRICKLY POPPY.

In replying to a letter received by the Department of Agriculture from a correspondent at Gladstone, asking for information concerning the Prickly Poppy, which he said was becoming a great nuisance in one part of the Calliope Shire, Mr. C. T. White, Government Botanist, stated that the plant is an annual, mainly a summer weed, though it may persist throughout the whole year. No easy method of eradication is known. Spraying with an arsenical weed killer should prove effective where the plants are growing thickly together, but the danger of animals being poisoned has to be taken into consideration. The young plants should be chipped out before reaching the seeding stage. Now is a good time to attack them as seedlings are very abundant about this time of the year (November). As cases are on record in Queensland of cattle eating the wilted plants after the weed has been cut down, they should be gathered together and burnt as soon as possible, as the plant is a poisonous one.

The Agricultural Chemist recommends the following as a suitable spray:—

"Half a pound of arsenic dissolved by means of $\frac{1}{4}$ lb. of caustic soda in 3 gallons of water, and this solution then diluted to 10 gallons with water."

Apiculture.

THE CAUSES OF THE PERIODICAL RETROGRESSION OF THE BEEKEEPING INDUSTRY IN AUSTRALIA.

FLUCTUATIONS IN PRODUCTION.

The Beekeeping Statistics of the last twenty years show some striking fluctuations in the number of hives of bees, the amount of honey and beeswax produced, and the average yield of honey per hive. Taking the last six years as an illustration we have the following figures:—

BEEKEEPING STATISTICS, 1914-19.

Year.	Number of —		Honey Produced.		Wax Produced.	
	Beekeepers.	Hives.	In lb.	Average per hive.	In lb.	Average per hive.
1914 ..	5,643	55,565	1,961,746	35 lb.	37,323	11 oz.
1915 ..	2,639	35,015	700,672	20 „	20,017	9 „
1916 ..	3,633	31,233	933,933	30 „	18,707	9½ „
1917 ..	3,661	36,561	1,547,023	42 „	22,131	9½ „
1918 ..	4,427	58,346	4,974,888	85 „	46,980	12½ „
1919 ..	4,374	52,782	1,644,447	31 „	25,286	7½ „

It is feared that the 1920 figures will reveal a further sharp decline.

The setbacks shown by the above table are due to two causes—

- (1) The absence of flowering herbaceous plants caused by drought;
- (2) The non-flowering of pollen-yielding Eucalypts.

In either case, reproduction during the working season ceases because the bees are unable to secure the necessary nitrogenous food, while the adult bees wear out in the natural course.

So far, the pollen substitutes to which beekeepers in Europe and America have recourse, during very brief periods of dearth, have proved unsatisfactory in Australia, the young bees reared on these substances (rye meal, pea meal, and flour) being weak and short-lived.

It will be seen from the table that, concurrent with the loss of hives, there is a pronounced reduction in the average yield per hive. This is accounted for by the small number of bees left in the surviving hives.

A suitable substitute for pollen, or some other means of supplying bees with the indispensable proteids, would be of immense value by preventing the periodical losses of thousands of bee colonies and the decrease in the production of honey and beeswax.

PECULIARITIES OF HONEY FLORA.

Under normal conditions bees obtain most of their pollen supply from the flowers of our native flora—Eucalypts, Banksias, Acacias, &c. Eucalypts, which are one of the main sources of pollen, are but little affected by a shortage in the rainfall, and if they flowered regularly—annually, like the flora of Europe—there would be no dearth of pollen. Most of the gum, however, flower only every second year, some every third, or even fourth year only; and, strange to say, all the trees of any particular species flower in the same year. So that, in the “off” year, there is no bloom and no pollen.

NON-POLLEN-YIELDING FLOWERS.

Some of the best nectar-bearing species, such as *Eucalyptus melliodora* (yellow box), *E. leucoxylon* (yellow gum), *E. polyanthemos* (red box), and *E. sideroxylon* (red ironbark), furnish no pollen for bees; although it must be assumed that their flowers, like all others, produce pollen. When, during the flowering of these trees, bees are unable to collect pollen from other sources, the colonies rapidly dwindle, owing to partially or entirely suspended brood rearing. When this occurs during a summer honey flow (such as from yellow box), extending over three months, not only is a large portion of the crop lost to the apiarist owing to the weakened condition of

the colonies, but, when an autumn follows (grey box, *E. hemiphloia* or stringybark, *E. macrorrhyncha*) this may be entirely lost. The bees recover, but too late to produce more than enough for their own needs. In the case of a honey flow from *E. leucoxydon* or *E. sideroxydon* late in autumn—neither of them pollen-yielding—the bees will often dwindle away entirely.

The apiarist can cope with a shortage of honey by feeding sugar syrup, but during a dearth of pollen he is helpless to prevent the gradual disappearance of his stocks.

DARK HONEYS.

Australia produces, perhaps, a greater number of varieties of honey than any of the other continents. Some of these honeys are rather dark, although quite equal in flavour and food value to the paler kinds. Owing to the modern craze of judging even articles of food almost solely by appearance, these darker honeys are hard to dispose of, especially in oversea markets, and then only at a greatly lowered price. If some method could be discovered for reducing the colour of this honey to a paler hue, and at the same time removing the excessive aroma of certain kinds, it would add immensely to the value of honey production. Further, it would enable the industry to operate on some of the best honey resources available, but now avoided on account of the colour of the honey.—“Victorian Bee Journal.”

ERADICATION OF SORREL.

Replying to a correspondent at the Soldiers' Settlement, Amiens, on the subject of this weed, Mr. C. T. White, F.L.S., Government Botanist, gives the following information thereon and the steps to be taken for its eradication:—

Sorrel (*Rumex acetosella*) is a great deal more troublesome in the Southern States than in Queensland, where it only occurs in great abundance in the cooler parts.

It usually only grows sufficiently well to be a nuisance on lands that are acid. This acid condition of the soil should be corrected by heavy applications of lime. In South Australia, where the weed is abundant, W. J. Spafford, Director of Experimental Work, states that in practice a good way to overcome this difficulty is by an application of at least 5 cwt. of lime per acre at least every alternate year; “but,” he continues, “it must be remembered that, with a small application like this, its effects on sorrel are not noticeable until the second year after applying. In a case in which one desires to rid the land of sorrel for the next year's crop, it would take an application of about 2 tons of lime per acre to have any effect on it.”

The abovenamed applications of lime are somewhat expensive in comparatively poor soils, and a more practical way to deal with the acidity of soils in a district, and the sorrel growing in them, would be wrapped up with cultivation and manuring. The thorough exposure of such soils will lead in time to their sweetening, and the cultivation necessary to give this exposure will directly kill the sorrel growing there. Bare fallow, in conditions existing in such districts, should receive at least three cultivations of some kind between ploughing and the cultivation preparing for seeding operations. In years during which the sorrel is plentiful, this may have to be increased, as it is desirable to rip up the plants, to be exposed to the drying atmosphere, every time they make their appearance. It has been proved by experience that, in soils at all likely to become acid, repeated applications of superphosphate tend to make them become more acid, so that, in cases in which heavy applications of lime are hardly warranted, superphosphate should be used as little as possible. I would suggest as manurings for cereals on such lands (1) $\frac{1}{4}$ cwt. superphosphate and 1 cwt. finely ground raw rock phosphate per acre, or (2) $\frac{3}{4}$ cwt. superphosphate and 2 cwt. agricultural lime per acre. The first mixture will be much the cheaper of the two. However, care must be taken to secure very finely ground rock phosphate. The superphosphate and lime will check the sorrel sooner than the other dressing, but will be dearer and more difficult to apply.’

Ada E. Georgía, in “Manual of Weeds,” gives the following advice:—

“Cultivate and enrich the ground, correcting its acid condition with heavy applications of lime. Grain crops infested are so robbed of moisture as to yield very poor returns; they may be helped by a spray of iron sulphate applied just as the weed comes into bloom; the rootstocks take no harm, but much of the leaf surface is destroyed, and seed development prevented for that season. Give surface cultivation after harvest, exposing the fibrous rootstocks and destroying the leaf growth, and also stirring dormant seeds into life. Reseed heavily, smothering the weed with strong grasses or clover.”

RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF OCTOBER IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALLS DURING OCTOBER, 1920 AND 1919, FOR COMPARISON.

Divisions and Stations.	AVERAGE RAINFALL.		TOTAL RAINFALL.		Divisions and Stations.	AVERAGE RAINFALL.		TOTAL RAINFALL.	
	Oct.	No. of Years' Records.	Oct., 1920.	Oct., 1919.		Oct.	No. of Years' Records.	Oct., 1920.	Oct., 1919.
<i>North Coast.</i>					<i>South Coast—continued:</i>				
	In.		In.	In.		In.		In.	In.
Atherton	0·88	19	1·39	0·43	Nambour	3·03	24	7·29	0·51
Cairns	1·98	38	1·31	0·18	Nanango	2·34	38	2·66	0·73
Cardwell	1·93	48	5·75	0·06	Rockhampton ...	1·80	33	4·19	1·58
Cooktown	1·12	44	1·90	0·15	Woodford	2·63	33	3·12	1·06
Herberton	0·89	33	1·33	0·06					
Ingham	1·49	28	2·39	Nil					
Innisfail	3·54	39	3·16	0·22					
Mossman	3·17	12	...	0·14					
Townsville	1·19	49	1·23	Nil					
<i>Central Coast.</i>					<i>Darling Downs.</i>				
					Dalby	2·11	50	2·64	0·87
Ayr	0·87	33	3·42	0·01	Emu Vale	2·33	24	2·79	0·54
Bowen	1·03	49	0·92	Nil	Jimbour	1·86	32	2·62	0·36
Charters Towers ...	0·65	38	0·68	Nil	Miles	1·97	35	3·27	0·17
Mackay	1·86	49	2·82	0·06	Stanthorpe	2·60	47	2·07	0·69
Proserpine	1·70	17	2·46	0·12	Toowoomba	2·66	48	3·82	0·50
St. Lawrence	1·84	49	3·58	0·42	Warwick	2·24	33	2·52	0·38
<i>South Coast.</i>									
					<i>Maranoa.</i>				
Biggenden	2·16	21	5·45	0·65	Roma	1·71	46	3·43	0·09
Bundaberg	2·14	37	3·27	2·28					
Brisbane	2·64	69	2·16	0·86					
Childers	2·25	25	9·27	4·71					
Crohamhurst	3·57	25	8·14	0·71					
Esk	2·37	33	5·86	1·15					
Gayndah	2·39	49	5·17	1·42					
Gympie	2·72	50	4·81	2·16					
Glasshouse M'tains	2·69	12	...	0·71					
Kilkivan	2·66	41	3·77	1·34					
Maryborough	2·74	49	4·25	2·92					
					<i>State Farms, &c.</i>				
					Bungeworgorai ...	1·03	6	3·04	0·06
					Gatton College ...	2·25	21	3·68	0·66
					Gindie	1·22	21	5·97	Nil
					Hermitage	1·89	14	2·95	0·51
					Kairi	1·03	6	1·27	Nil
					Sugar Experiment				
					Station, Mackay	1·69	23	2·15	0·01
					Warren	2·37	6	5·46	2·48

NOTE.—The averages have been compiled from official data during the periods indicated; but the totals, for October this year, and for the same period of 1919, having been compiled from telegraphic reports are subject to revision.

GEORGE G. BOND, State Meteorologist.

Plant Pathology.

THE ROOT DISEASE OF THE BANANA IN NORTH QUEENSLAND.

BY J. F. ILLINGWORTH.

During 1917 I received a communication from the Department requesting me to make an investigation of this trouble in the banana gardens of the Cairns district. Hence, in company with Mr. G. Williams, Fruit Inspector, located in Cairns at the time, I immediately made a survey of the affected Chinese gardens in the Freshwater area.

Most distressing conditions were at once apparent. None of the banana plants were making healthy growth—even the Cavendish (*Musa chinensis*), which is usually more or less immune to disease, appeared to be drought-stricken. All of the lower leaves were either dead or dying, the rest of the top lacking the usual healthy green colour, and the bunches were very much dwarfed. In fact, conditions were so bad that most of the growers were fast going out of bananas—planting their land to pineapples and citrus fruits.

Digging the plants, we found that most of the feeding rootlets were dead or rotted off (see figs. 1 and 2), while even the larger roots showed decay in patches, particularly at the points where the rootlets had disappeared. The surface of the corm, too, had brown areas, where the disease had worked up to it from the dying roots. There was every indication of a fungus trouble; still I was at a loss to account for the fact that the disease was equally virulent on all classes of soil. I thought, at first, that it might have a relation to drainage, but I soon found that, even on the dry sandy-loam of hillsides, the plants were no better, for here some stools had actually toppled out of the ground for want of roots.

Abundance of fresh material was collected for a microscopic study, and I proceeded at once with this to the laboratory. Selecting some of these roots which were devoid of rootlets and root hairs (see figs. 1 and 2), I made numerous thin cross-sections, cutting through the darkened areas where the rootlets had rotted off. Examination of these sections under the compound microscope revealed myriads of Nematode worms (see fig. 5), especially at the point of contact of diseased and sound tissue. Furthermore, I found these organisms in all conditions—eggs, nymphs, and the adults, fully developed. Strange to relate, there was little indication of fungus present, the few pieces of mycelium observed being evidently saprophytic and connected with the decaying tissue. I was unable to locate either mycelium or spores in connection with the living tissue of the roots. Hence I do not consider the disease in any way due to fungus.

DESCRIPTION OF THE PEST.

Tylenchus sp. (see figs. 3 and 4).

Though these worms are very different in form from the ordinary, well-known, gall-forming Nematodes, never having the tremendous enlargement common to the females of *Heterodera radicola*, I feel confident that they are the cause of the distress. Furthermore, Dr. Cobb* has described a species in Hawaii, which does very similar damage to the roots of sugar-cane.

It is not surprising that these organisms have not been discovered here before, since there is no enlargement of the roots, and after the material is preserved, it is a very difficult matter to locate these tiny, slender pests. Moreover, it is mainly the activity of their movements in the tissue that makes them visible.

* Hawaiian Sugar Planter's Assn., Bul. No. 6, Div. Path. and Physiol., p. 63.

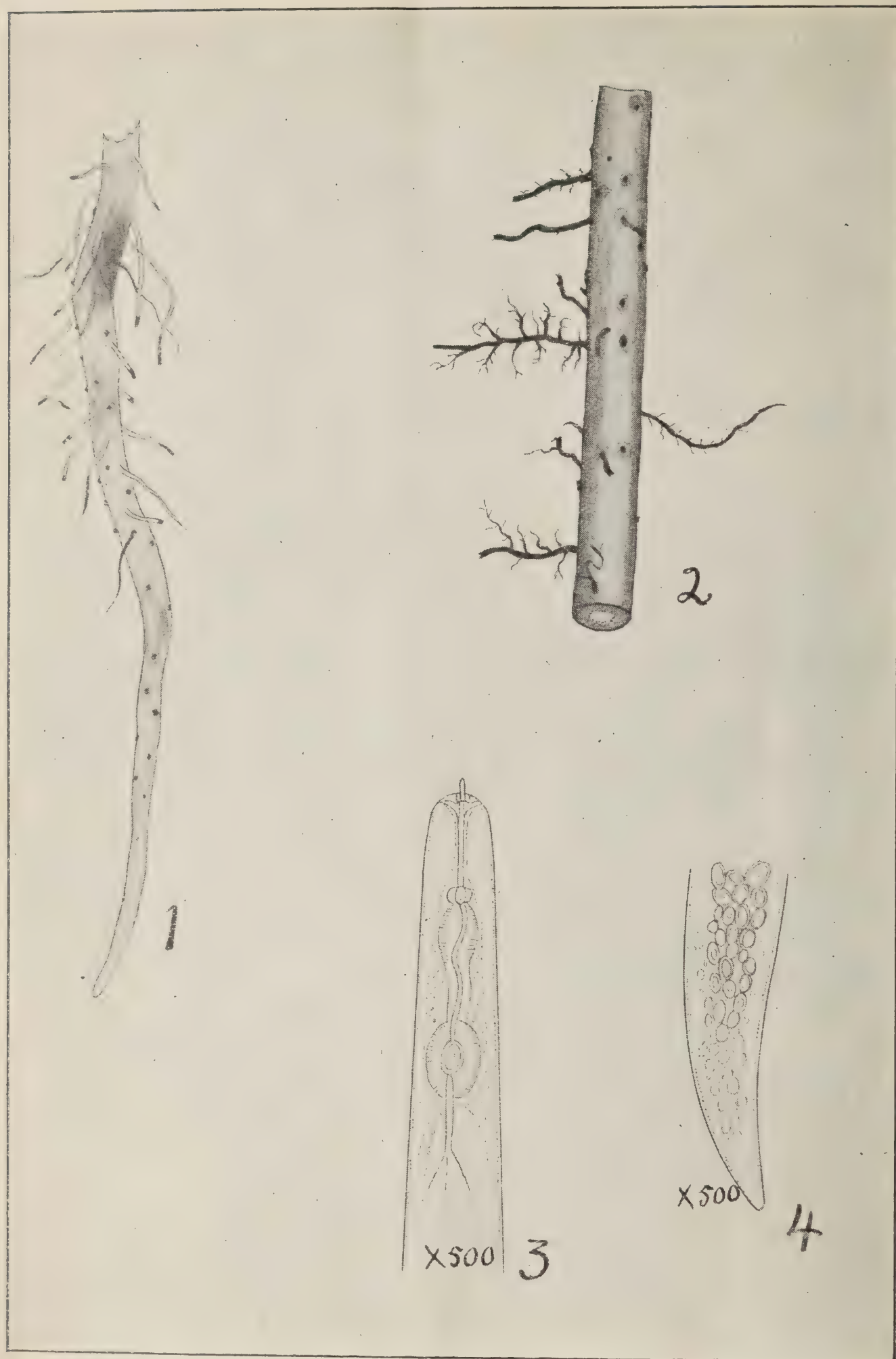


PLATE 26.

FIG. 1.—Terminal portion of root of banana, natural size, showing typical injury caused by the nematode worm, *Tylenchus* sp. The black spots are where the feeding-roots have been eaten off by the worms before entering the tissue of the main root.

FIG. 2.—A portion of an older root, natural size, showing the same characteristic injury.

FIG. 3.—Head end of the worm, magnified 500 diameters. Note the spear at the mouth, with which the plant-tissue is broken down.

FIG. 4.—Tail portion of the same worm.



PLATE 27.

FIG. 5.—Cross section of the root shown in Fig. 1, cut through one of the blackened spots. The worms entering through the rootlets feed principally upon the parenchyma. The infested tissue becomes red, changing to purple, then brown, and finally black, where exposed to the air.

by t
eat

with

CONTROL MEASURES.

Ordinarily Nematodes are considered most difficult pests to control. I am pleased, however, to note that recent investigations* by Mr. A. H. Benson, Director of Fruit Culture, give promise of results for eelworms in general. He states:—

“Some two years ago I decided to test the effect of dipping banana plants, prior to planting, in a 1 in 1,000 solution of corrosive sublimate, which I had previously found beneficial in the case of potatoes and for destroying earth worms; so thought it possible it would be found of value in the case of bananas.

“A number of strong suckers were, therefore, obtained, and all roots and loose matter were removed from the bulbs, and they were then placed in a solution of corrosive sublimate, made by dissolving 1 oz. of this material in 6 gallons of water, the result being a solution of 1 in 960. They were allowed to remain in the solution for two hours, and then planted; and no injury was done, even though they were allowed to remain in the solution much longer.

“The suckers, when so treated, were planted at different depths—viz., 12 inches, 18 inches, and 2 feet—in volcanic soil of fairly heavy texture; and all came away without any loss, those planted at 12 inches making the earliest start and eventually producing the best plants as well as developing the most suckers. So far, no nematodes have been discovered on the roots of any of the treated plants, irrespective of the depth of planting.”

Since arsenic (arsenious acid) is proving so effective for the destruction of white grubs in the soil, and since this poison has not shown any detrimental effects upon the root-system of sugar-cane, it may prove of value for other root-destroying organisms. It certainly would be well to try it. This should be done by dusting the corms, and the soil in the holes where they are planted, with the dry arsenic; also, by mixing the poison with the soil in infested fields, before putting in the sets.

Lime, too, may have some value, and should be tried out thoroughly when planting.

THE WORLD'S WHEAT: A FORECAST.

Sir James Wilson, K.C.S.I., who at one time was delegate for Britain and the Dominions at the International Institute of Agriculture, Rome, is a recognised authority on the economics of crop production, and we are in receipt of an exhaustive review by him on the position of the world's wheat supply. In summarising the various statements and estimates set out in his review, Sir James comes to the interesting conclusion that all the exporting countries of the world, which on the pre-war average exported 170,000,000 quintals (10 quintals are approximately equal to 1 ton), are likely to be able to spare for export during the year ending July, 1921, something like 276,000,000 quintals, while, on the other hand, the importing countries of the world may not require to import more than 150,000,000 quintals, leaving a surplus in the exporting countries of 126,000,000 quintals of old wheat. He is further of opinion that even if India, Roumania, and Russia export no wheat during the year ending with July, 1921, the other exporting countries will probably meet all the requirements of importing countries until then, and yet have a surplus of 38,000,000 quintals on the 1st August, 1921.—Journal of the Department of Agriculture of South Africa.

* Qsld. Ann. Rept. Dep't. Agri. and Stock, 1919, p. 51.

Entomology.

CANE GRUB INVESTIGATION.

The General Superintendent of the Bureau of Sugar Experiment Stations has received the following report upon Cane Grub Investigation, from the Entomologist, Dr. J. F. Illingworth:—

Weather conditions could not have been better for growing cane; light showers have continued throughout the dry season, and both the young plants and the ratoons give promise of an excellent crop. Furthermore, these favourable climatic conditions have done much to stimulate diseases among the grubs, so there is every prospect of a considerable diminution in these pests.

As indicated in former reports, the beetles were very erratic in their flight last season, and they missed many areas altogether that have regularly been infested in former years. This fortunately was the case in the Innisfail district—the crop, being practically free from grubs, has cut splendidly. A few places, however, like Greenhills, in the Cairns district, have never had a worse year. Early in the season the estimate for that estate was about 12,000 tons, but the grub-injury became so widespread that practically all the fields were affected, and hundreds of acres were a total loss. It is distressing to report that only 2,400 tons could be harvested; and most of this was very short and light, so that it hardly paid for cutting in many instances.

Fortunately, nature is now lending us a hand in these devastated areas; not only have the grubs been practically wiped out in places by fungus and bacterial diseases, but on top of this we find that the parasitic wasps, *Campsomeris* sp., were never more abundant; the males are flying about over the surface of the ground in thousands, thus indicating that their mates are numerous below searching out the grubs. Apparently these wasps have multiplied exceedingly during the past few months; and, undoubtedly they are kept in the infested area by the abundance of flowering weeds which are now growing on the fields thrown out of cultivation. Chief among these, the wasps appear to favour the Chinese burr, which has nectaries on the petioles as well as those in the flowers. Early in the morning, before the sun is hot, the female wasps are to be seen on these plants in great numbers. The males I have often found clustered together roosting on weeds at evening, when the weather is damp and cool. Under such conditions it is possible to gather a handful in one spot—male wasps are said to have no sting, but I found that these fellows were able to pierce the skin with the three prongs borne on the terminal segment of the abdomen, and apparently, they produce some poison, for there is a very strong odour of formic acid; at any rate, the feeling was not very comfortable where they punctured my fingers.

During this off season for the grubs, a number of other pests have continued troublesome, chief among these I might mention cutworms, grasshoppers, and the linear bugs.

ARSENIC FOR CANE GRUBS.

It is very satisfactory to report that the cane is making most excellent growth in all of the plots treated with arsenic, and especially in the plot where the poison was applied at the rate of 200 lb. per acre, which was done to see if a heavy dressing of arsenic would in any way hinder growth.

During the past few months I have experienced considerable difficulty with white grubs in the garden. In preparing the soil for cucumbers, &c., I worked fresh cow dung thoroughly into each hill, covering with soft earth. By this treatment the cucumbers invariably failed, the vines yellowing and drying up before the fruit was produced. I found that the soil was full of grubs, attracted by the manure, and they had evidently eaten all the roots from the plants. These were mostly the larvæ of *Isodom puncticollis*, Macleay, which must be very rapid in development, for no grubs were in the soil when the hills were prepared a few weeks previously.

I tried arsenic in this case as a control measure, with excellent results. Hills in which the grubs were present in all stages were dusted with the poison at the rate of about 80 lb. per acre, and this was worked well into the soil. A fortnight later practically all the grubs had disappeared in the treated hills, though but very few of the blackened dead ones were seen; probably the others were removed by ants, which were abundant in the hills. Also, it was observed that there was no diminution in the number of grubs in the untreated hills.

It will probably be found best to apply the poison to the manure when preparing the hills for planting, similar to the placing of the arsenic in the drill with cane plants.

CUTWORMS.

The Army-worm, *Cirphis unipuncta*, Haw., has continued to give trouble in various sections. They are often destructive to young corn, and appear to prefer ratoon cane, just as it is beginning to shoot out. Though this pest has a number of excellent parasites, it often gets away from them for some reason, and does a lot of mischief.

Recently I experienced a serious outbreak at Malanda, on the Tableland, where the caterpillars were in such numbers that they spread from a grass paddock, which they practically killed out, right through a field of oats, stripping it to stubble, and ending up in a field of young corn, which was eaten off to the ground level before the army was ready to pupate. In this case no parasites were in evidence.

GRASSHOPPERS.

Some time ago I called attention to a plague of grasshoppers (*Locusta australis*, Brunner) at Meringa. Evidently what were left of that flight produced well, for recently young hoppers came forth in extreme numbers. They travelled like a flock of sheep in one general direction, and wherever they camped to feed, the vegetation was eaten to the midribs. In the last nymphal stage, which they had reached when my attention was called to them, they were stripping the leaves of even the old cane, and playing havoc with the young plant.

I at once set about to control them, lest, if they were permitted to reach the winged stage, they might possibly fly more widely and prove a serious menace.

I made several lots of a poisoned bait, using the formula which proved so successful in Kansas:—

Bran	20 lb.
White arsenic	1 lb.
Molasses	2 qts.
Lemons	3
Water	3½ gals.

The arsenic was mixed with the bran dry; the lemons were then minced in the meat-grinder and added with the molasses and water, stirring so as to dampen the mash thoroughly. It was found that the oil from the rind of the lemons greatly increased the attractiveness of the bait.

The mash was sown broadcast, as advocated, in strips through the infested area. I found it very satisfactory to sow it only in every third or fourth centre between the cane rows, for the young hoppers quickly crawl to the treated strips.

Sown broadcast, the particles are so small that there is little danger of poisoning birds or poultry, and the greatest number of insects will get it in the shortest time.

The results were most remarkable, for even the winged insects were found eating the bait upon the ground. About four hours after treatment I examined the field and found many sick hoppers, which had already crawled under the stools of cane, where they were too weak to get out of the way. Next day the dead hoppers were everywhere, especially under the stools or any trash that happened to be lying about.

It was practically a clean sweep of both young and adults. I was surprised that the winged insects could be handled so effectively, especially since the cane was standing, and there was an abundance of green feed everywhere about.

LINEAR BUGS.

These sucking insects, *Phaenacantha australica*, Kirk., continue to be exceedingly abundant in widely-separated localities. They certainly do a lot of damage by removing so much sap from the mature plant. Naturally this must draw seriously upon the stored sugar in the cane.

I have never seen these bugs more abundant than I found them in the vicinity of the South Johnstone Experiment Station. The cane adjoining the scrub simply swarmed with them—hundreds sometimes beneath a single leaf, and all with their beaks inserted. Is it any wonder that the leaves turn yellow and die back from the tips?

While studying the death-factors of these insects, I found that the adjoining scrub was literally full of the adults. They were roosting all over the vegetation, apparently without regard to the kind of plant. In the cane a good many were caught in spider-webs, and a few were destroyed by the larger Reduviid bugs, which are regularly predaceous in their habits. The worst enemy that I was able to discover was the ant, *Pheidole megacephala*, which destroys many of them when they are down in the grass on dark wet days.

Undoubtedly many of the eggs are parasitised or eaten by predators, but they are so small and difficult to locate, that this phase of the problem requires considerably more investigation.

BEETLE BORER.

Fortunately these insects are not so abundant this season, though they are gradually becoming more widely spread. The Innisfail district has not suffered this season as much as usual, for some reason. Yet this immunity cannot be due to the parasites, for I was unable to find any trace of the flies that have been liberated there from time to time. I discovered on my recent trip that wherever the signs of the borers were particularly noticeable the ants had taken possession of their runs, cleaning out the grass and destroying most of the grubs. During wet weather these valuable predators must effect a material reduction of the pest. It is a well-known fact that ants must get out of the saturated soil with their brood, and the borer runs are ideal habitations when cleared of the grass. Apparently they find it difficult to dislodge the borer, however, once he has formed his cocoon, which is a mass of compactly woven cane fibres.

Standover cane from Mount Sophia showed the greatest damage from borers this season, hence we have recently liberated a considerable colony of the parasites in a near-by field where the cane is to be cut late, so as to give the flies a chance to get started.

SUGAR-CANE LEAFHOPPERS ON THE TABLELAND.

I was interested while examining the cane growing at Malanda and at the State Farm, Kairi, to note that leafhoppers were more abundant than at lower elevations. This coincides with observations in Hawaii, where the pest gives considerably more trouble in the elevated areas, since the egg-parasites are not so effective under lowered temperature.

The cane was rather yellow and stunted, not having the dark green colour and the vigour common to the lowlands; still this may have been due to the continued drought, for all the surrounding pastures were dry and brown.

In several instances I found leafhoppers dead and sticking to the leaves, where they had succumbed to some kind of a fungus disease.

HELPING THE HOSPITALS.

“Over fifty flockmasters in Rothbury (Northumberland) district, have,” says the London “Live Stock Journal” for September, 1920, “decided to give a sheep each, annually, to be sold on behalf of the Newcastle Infirmary.” This generosity on the part of British farmers might be emulated by Queensland “flockmasters,” who own tens of thousands more sheep than all the farmers in every county of the United Kingdom, and not a grazier would miss one or two sheep so donated annually.

General Notes.

SILVER WATTLE GUM.

OBTAINED FROM *ACACIA RIVALIS*.

The "Journal of Agriculture" of South Australia (October, 1920) contains the following interesting article on the Silver Wattle Tree, and its commercial value as a producer of gum, contributed by H. W. Andrew, Botanical Assistant, &c.:—

For upwards of thirty years a comparatively little known industry, the gathering of the so-called "silver wattle" gum, has been established in the Flinders Range over a narrow strip of country extending roughly between Moolooloo, Blinman, and Hawker.

Although this acacia has thus been known commercially for a good number of years, no previous record in Australian literature is to be found as to the distribution or botanical name of the tree from which the gum is derived. This is accounted for by the rather remarkable fact that the tree has only been known botanically since 1918. The following details, therefore, are deemed worthy of placing on record.

DISTRIBUTION.

When in the Blinman district last August I made inquiries concerning the tree from which this gum is collected. About 2 miles east of the Blinman township trees were seen growing, from which the "silver wattle" gum was collected by local people each year. A few days later, at Moolooloo Station, about 9 miles from Blinman, I again came across the tree, where it appeared to be fairly plentiful. Here also it received the same name, "silver wattle," and the manager of the Moolooloo Station confirmed the statement made to me by others, viz., that this was the tree from which the local "silver wattle" gum is secured. On examination the tree proved to be *Acacia rivalis*, J. M. Black. This species was first described and recorded by Mr. Black, who was not aware of its economic value, in the "Transactions of the Royal Society of South Australia," vol xlii., year 1918, from specimens found growing in the bed of a creek near Hawker in October, 1917. A note in that journal states that a specimen was submitted to Mr. J. H. Maiden, the leading authority on Australian acacias, who agreed that it was probably a new species, and further that "its affinity appears to be with *A. leprosa*, Sieb., var. *tenuifolia*, Benth., in the flowers and bracts, and with the narrow forms of *A. stricta*, Willd., in the phyllodes and general appearance, but the flowers and pods are totally different. The pods are a good deal like those of *A. calamifolia* and its allies. Without flowers and pods it could easily be mistaken for *A. aestivalis*, Pritzel, a Western Australian species."

The Gum.—From a number of inquiries made concerning this gum it was ascertained the minimum quantity produced and sold this year was 6 tons, the wholesale price paid for which was approximately 70s. per cwt. One firm put down the production this year at 10-14 tons.

Supplies chiefly come from the Blinman district, and appear to be bought up largely from the pickers by local storekeepers, and ultimately sent to Adelaide. Production varies very much according to the climatic conditions of the gumming season, which usually begins about January; 4-14 tons are said to be produced annually.

Commercial lots of this year's gum actually examined in Adelaide very much resemble in appearance gum arabic obtained from *Acacia senegal*, varying from

light yellow to a cherry red, and beautifully frosted on the surface, the pellets of gum ranging in size from that of a small marble to a medium-sized apple. Another local trade name for the gum is "first light grade gum."

So far I have been unable to ascertain definitely the use to which this gum is put, or the ultimate destination of main supplies. Doubtless it is used frequently as a substitute for gum arabic, though it was said to be unsuitable in the manufacturing of jujubes. Before the war most of it seems to have gone to Germany, and subsequently much of it was disposed of in Australia.

Although I did not traverse the whole of the district where this wattle is growing, still I could not help being struck with the marked absence of young trees over the country covered; rabbits and stock, no doubt, both play a rôle in reducing the area of this very useful native tree.

The fact that this plant, though known commercially for so many years, was not described botanically at an earlier date is a striking commentary on work done with our useful native plants. The definite mapping out of the region covered by this tree, which appears to be peculiar to this part of Australia, one would think might be undertaken with advantage.

HOW THE BLIND CAN READ.

Arrangements have been made with a British firm to manufacture the Optophone, a wonderful instrument which enables the blind to read ordinary type. This instrument, which was recently perfected by the inventor, depends for its action on the peculiar properties of selenium. This metal changes its electrical resistance under the influence of light. In the Optophone five minute beams of light fall upon the printed letters and are reflected on to a selenium cell which forms part of a telephone circuit. The blind operator sits with the telephone receiver to his ear and moves the line of type along. Each letter, according to its shape, alters the current in the telephone circuit in a particular way, giving a characteristic change of sound. By this means the blind can spell out the words.—"Industrial Publicity Service," London.

HOW FORESTRY INCREASES THE FARM INCOME.

In the issue of the Journal for June, 1920, and in several previous numbers, we have pointed out how the planting of timber trees could be a source of revenue to farmers, without affecting their main industry—but proving an aid to it, in the way of break-winds affording shelter to orchards, vineyards, &c., and, furthermore, supplying much of the timber required for fencing, for stockyards, and various other purposes.

In one of our late exchanges, we found the following reasons for the planting of trees on farms, without any diminution of the areas devoted to crops. These are:—

1. Making waste lands yield a profit by growing timber on poor soils, steep slopes, rocky lands, wet lands, unused corners, gullied or eroded lands.
2. Furnishing paying employment for men and teams during the winter.
3. Utilising timber better on the farm and avoiding waste by cutting low stumps and small tops, using substitute woods in construction, treating nonlasting woods.
4. Increasing crop yields by planting forest tree windbreaks.
5. Growing more and better timber on the farm through protecting the woods from fire and overgrazing; selecting for cutting the mature, defective, overcrowded, and inferior kinds of trees, and leaving the straight, thrifty, and better kinds; planting to fill up openings in woodlands.

6. Marketing the higher grades of wood products direct to consumers at fair prices in the form of saw logs, poles, piling, cooperage bolts, handle bolts, posts, pulp wood, firewood, spoke blocks, tannin wood and bark.

The forest lands held by farmers in the Southern States (U.S.A.) constitute a total of about 124,000,000 acres, which is more than one-third (35 per cent.) of all the farm lands of that section. These farm woodlands represent more than one-half of the entire forest land in the Southern States, and nearly one-half is sold in the form of logs, other cut products, and as standing timber. The remainder is used on the farm.

FLAX-GROWING.

The Perth "Farmer," W.A., 5th November, stated that during the previous week, "The Minister for Trade and Customs (Mr. Massey Greene) announced that the Government had guaranteed £6 a ton for standard flax grown during the season 1921. There appeared to be every prospect of the price of flax fibre remaining at a high level for some time, and as it was being sold on the open market, the farmers would receive the full world's value for their product. Any surplus from this crop over and above the cost of treatment would be returned to the growers.

"The Minister has received information from the Commonwealth Flax Committee to the effect that further satisfactory sales of fibre have been made, and that the committee hopes to be able in a short time to declare a further substantial dividend on the flax crop of 1918, the growers having been paid already £7 a ton."

We ("Q.A.J.") have frequently advocated the cultivation of flax as a payable proposition. We have also conclusively shown, by the published results of this industry in the Southern States, that the climate and soils of Queensland are able to fulfil all the conditions needed for successful flax culture and for the production of linseed. In the issue of this Journal for July, 1919, will be found a paper by Mr. H. A. Strain, of Terror's Creek, who has had a life-long experience in all branches of the business, both in the field and in the factory, on this subject, and in the September number of the same year we received from the Department of Agriculture, Nairobi, British East Africa, a very informative pamphlet on flaxgrowing, and its preparation for market, by Mr. Hugh Simpson, Flax Instructor, entitled "Hints on Flax Culture," and "Flax as a Fibre Plant." The pamphlet deals with such subjects as soils suitable for the crop, rotation of flax, selection of seed, sewing, weeding, "pulling," threshing out the seed, watering or retting to decompose the vegetable matter connecting the stem and fibre; spreading, lifting, and breaking the dry stems; scotching, hackling, and treatment of the tow. Subsequently we received a report giving particulars of the returns from a flax crop grown at Emerald, on the Fern Tree Gully, 30 miles from Melbourne. From this report it may be judged how a flax crop would pay in Southern Queensland. This crop, on 90 acres, yielded to the grower a gross result of £110 per acre. He cut from the above area 2,500 tons of green leaf, which yielded 300 tons of fibre. As the value of the fibre was then (November, 1919) £33 per ton, the gross return per acre was, as stated, £110.

From various sources we understand that the net profit on the seed alone is set down at £8 10s., and of the fibre £7, which would make the profit amount to £15 10s. per acre. Since that was written, however, not only wages but many other adjuncts to the production of flax, fibre, and linseed, have risen in cost, and we must await the balance-sheet of any present flaxgrower to arrive at a correct estimate of production, cost of marketing, &c.

PIG-FATTENING EXPERIMENTS WITH DRIED BLOOD.

Apropos of our notes lately published on the effect of feeding dried blood to pigs, particularly the successful experiment recorded by a Beerwah farmer, we find, in the November number of the "Agricultural Gazette," of 2nd November, 1920, the following notes of experiments made in England by the Food Investigation Board and the Ministry of Agriculture, with a view to determining the value and

safety of dried blood as a nitrogen-supplying portion of a fattening animal's ration. Results of previous trials with dried blood had indicated its food-value when added to a mixed diet, and this experiment was restricted to the effect of blood as an addition to a carbohydrate diet:—

“Twenty-eight pigs were selected and divided into four lots of seven pigs each; each lot being arranged to average, as nearly as possible, the same total live weight, and to include two ‘large white,’ one ‘large black,’ and four cross-bred pigs. The four pens of seven pigs were fed as follows:—Lot 1, wheat offals only; Lot 2, maize meal only; Lot 3, wheat offals and dried blood; Lot 4, maize meal and dried blood. In addition, each pig received $\frac{1}{2}$ oz. bonemeal daily.

“The amount of blood fed to each pig in Lots 3 and 4 was 2 oz. per day to begin with, rising gradually to 6oz., an average of 4 oz. per day. It took two or three days before the pigs tolerated the blood, but they eventually took it willingly.

“The pigs were weighed at weekly intervals, and after eleven weeks’ feeding made a gain of 268 lb. in Lot 1, 283 lb. in Lot 3, and 207 lb. in Lot 4, and a loss of 3 lb. in Lot 2. The pigs in Lot 2 showed very little appetite, and after a week or two took their ration of plain maize meal with reluctance, and only when pressed by hunger. The results obtained indicated that the addition of blood to an ordinary farm ration of wheat offals may cause a very considerable gain in weight, compared with the results obtained from a farm diet of offals only, while the addition of blood to plain maize meal may give an increase equal to the results obtained from feeding offals only.”

COST OF SUGAR-GROWING AND SUGAR MANUFACTURE IN 1892 AND 1920.

The late Mr. S. Grimes, M.L.A., writing, in 1892, to a Brisbane newspaper on this subject, to correct the figures given in a report of a speech by him at Corinda, gave the following statement as correct:—Cost of cultivation, £3 per ton of sugar, or £4 10s. per acre; cutting cane, at 2s. per ton, £2; cartage of cane, 18s. 8d. per ton; manufacturing, £2 8s.; bags and freight, 15s. 11d.; interest on capital, £2 9s. 6d.; depreciation, 5 per cent. on machinery, £1; making a total cost of £12 11s. 2d., which, at the then price of sugar—namely, £15 per ton, gave a margin of profit of £2 8s. as the result of the employment of European labour.

Since that time conditions in connection with the sugar industry have changed in almost every particular, especially in the items of labour, improved machinery, &c. Taking the cost of cultivation: This amounts approximately to £18 per acre, in the case of ploughed land, and to still more on newly-felled or unstumped scrub land. The cost of cutting cane in the South may be set down at 7s. 6d. per ton, in the Central district at 7s. 9d., and in the Northern section at 8s., where the crop runs to 15 tons and over per acre. The transport of cane by wagons for distances up to 2 miles, averages 2s. 8d. per ton. Beyond that distance a special rate is provided for. When, however, the cane is hauled over portable tramlines to a permanent line, the charge is reduced to 1s. 6d. per ton. The mill then takes delivery and hauls the cane free gratis for the grower.

The cost of manufacturing for the season 1917-18 amounted at Babinda in the North to £2 2s. 10d. per ton, including all charges, as well as depreciation. The present price of raw sugar is £30 6s. 8d. per ton.

THE AMERICAN COTTON SITUATION.

The wave of depression caused by the apathy of the distributing markets in yarn and cloth continues unchecked. The weakness displayed by the cotton markets this week is largely due to the attitude of the South by reason of the world's lack of interest in the raw material, with a consequence that values have now declined to a point materially below the cost of production, which the Texas State Department of Agriculture estimates as high as 46 cents per lb. The low level cannot be

justified, having regard to the present tendency to reduce crop estimates, the reports of damage to grade by reason of heavy rains, and that the world's mills are not in a position, owing to reduced working hours and idle spindles, to meet a normal demand. The present enforced curtailment of production by reason of buyers hesitating to place business must accentuate the difficulty in meeting the world's requirements. It seems logical to reason that business must eventually be placed, and that demand for the manufactured article will again be an important factor in influencing the cotton markets.

Advices invariably refer to a lowering of the condition of the crop. The "Memphis Commercial Appeal" forecasts a yield of 12,600,000 bales, and the Southern Products Company of 11,640,000.

The "New York Journal of Commerce," in its monthly review of the crop outlook, reports deterioration, and that generally there is no promise of a top crop. Nevertheless, these reports are ignored by the markets.

The following are the official "Spot" prices in Liverpool yesterday, and on the corresponding dates in 1919, 1918, and 1917:—

—	1920.	1920. Last Week.	1919.	1918.	1917.
"Middling" American	19.17	21.35	19.32	23.90	18.62N
"Good Middling" American ..	22.67	24.85	20.52	24.53	19.07
"Fair" Pernam.. ..	21.42N	23.35N	22.22N	29.86N	20.60N
"F.G.F. Sakel," Egyptian ..	54.00	57.00	30.00	29.40	31.35
"Fine" Broach	16.35N	17.60N	18.20N	24.50N	18.70N
"Fine" No. 1 Oomra	14.85N	15.35N	16.95N	22.75N	17.50N
"Fine" Bengal	9.25N	9.50N	14.85N	20.25N	16.00N

AVERAGE WEEKLY CONSUMPTION OF GREAT BRITAIN DURING TWELVE MONTHS.

SEASONS ENDED 31ST JULY.

Season.					American.	Egyptian.	Total.
1914-15	..	..	..	..	61,720	6,010	74,810
1915-16	..	..	..	..	62,140	6,980	76,280
1916-17	..	..	..	..	55,700	6,780	68,600
1917-18	..	..	..	..	44,250	6,760	56,930
1918-19	..	..	..	..	41,020	9,920	55,270

Answers to Correspondents.

THE USE OF BLUESTONE ON BLOWN SHEEP.

W. LAMB, Pine Vale, Dagmar.—

Replying to your question, Mr. W. G. Brown, sheep and wool expert of the Department of Agriculture and Stock, advises 2 lb. bluestone to 4 gallons of water, or in similar proportions for larger or smaller quantities.

SOUTHERN FRUIT MARKETS.

Article.					NOVEMBER.	
					Prices.	
Bananas (Tweed River), per double case	...	...	...	...	30s. to 33s.	
Bananas (Queensland), per double case	...	...	...	...	26s. to 35s.	
Bananas (Fiji), per double case	...	...	...	...	...
Cucumbers (Queensland), per case	...	...	...	...	16s. to 20s.	
Lemons, per bushel case	...	...	...	...	6s. to 8s.	
Mandarins, per case	...	...	...	...	12s. to 20s.	
Oranges (common), per bushel case	...	...	...	...	10s. to 13s. 6d.	
Oranges (Navel), per bushel case	...	...	...	...	12s. to 20s.	
Passion Fruit, per bushel case	...	...	...	...	14s. to 20s.	
Pineapples (Queens), per double case	...	...	...	...	16s. to 21s.	
Pineapples (Ripley), per double case	...	...	...	...	18s. to 22s.	
Pineapples (common), per double case	...	...	...	...	5s. to 8s.	
Tomatoes (Queensland), per $\frac{1}{2}$ -case	...	...	...	...	15s. to 30s.	

PRICES OF FRUIT—TURBOT STREET MARKETS.

Apples, Eating, per half bushel case	...	...	...	...	13s. to 17s.	
Apples, Cooking, per bushel case	...	...	...	...	11s. to 14s.	
Bananas (Cavendish), per dozen	...	...	...	...	8d. to 10½d.	
Bananas (Sugar), per dozen	...	...	...	...	5d. to 9d.	
Cape Gooseberries, per quart	...	...	...	...	10d. to 11d.	
Citrons, per cwt.	...	...	...	...	16s.	
Cocoanuts, per sack	...	...	...	...	£1 5s.	
Cumquats, per quarter case	...	...	...	...	4s. to 5s. 6d.	
Custard Apples, per case	...	...	...	...	3s. to 6s.	
Lemons (Lisbon), per quarter case	...	...	...	...	4s. to 9s.	
Mandarins (special), per case	...	...	...	...	14s. to 18s. 6d.	
Oranges (Seville), per cwt.	...	...	...	...	16s.	
Oranges (special), per case	...	...	...	...	14s. to 16s. 6d.	
Oranges (second crop), per case	...	...	...	...	3s. to 6s. 6d.	
Papaw Apples, per quarter tray	...	...	...	...	2s. 6d. to 6s. 6d.	
Passion Fruit, per half bushel case	...	...	...	...	12s. to 14s. 6d.	
Peaches, per half bushel case	...	...	...	...	5s. to 10s.	
Pineapples (smooth), per case	...	...	...	...	7s. to 10s.	
Pineapples (rough), per case	...	...	...	...	9s. 6d. to 12s.	
Strawberries, per dozen boxes	...	...	...	...	5s. to 10s.	
Tomatoes, per quarter case	...	...	...	...	14s. to 17s.	

TOP PRICES, ENOGGERA YARDS, OCTOBER, 1920. !

Animal.					OCTOBER.	
					Prices.	
Bullocks	...	...	...	...	£25 to £30 15s.	
Cows	...	...	...	...	£18 17s. 6d. to £20	
Merino Wethers	...	...	...	...	49s.	
Crossbred Wethers	...	...	...	...	40s.	
Merino Ewes	...	...	...	...	29s. 6d.	
Crossbred Ewes	...	...	...	...	35s. 6d.	
Lambs	...	...	...	...	37s.	
Pigs (Porkers)	...	...	...	...	68s. 6d.	

Orchard Notes for January.

THE SOUTHERN COAST DISTRICTS.

The fruit of the month in this part of the State is the grape, and its gathering and marketing will occupy the attention of growers. Care should be taken to cut the fruit when cool and dry, and if it has to be sent any distance the stems of the bunches should be allowed to wilt before the fruit is packed, as the berries will then hang on to the bunch better, and the bunch carry in better order. Select the fruit carefully, grade it, and pack firmly so that it will not bruise in transit. If to be sent long distances, pack in crates holding from four to six 6-lb. baskets. Pines will be ripening in quantity towards the end of the month. Gather before fully coloured, and, whether for Southern or local markets, pack and handle carefully to prevent bruising. Do not ship the fruit too green for the Southern markets, as doing so is apt to spoil the trade. Send good fruit to the canneries. Small pines and crippled fruit are no good to canners, and the sooner our growers realise that it only pays to grow good fruit the better for them and for the canners, for if the latter cannot get good fruit, it is impossible for them to put a line of goods on the market that will not only be a credit to the State, but for which a world-wide market can be obtained.

Passion fruit should not be allowed to lie about for days on the ground before gathering, as, if so, they are apt to become fly-infested.

Watermelons and rockmelons are still in season.

Watch any late peaches, Japanese plums, or other fruits liable to be infested with fruit-fly, and gather and destroy all infested fruit, or, better still, grub the trees out and burn them, as they only breed flies to destroy more valuable fruit. Mangoes will be ripening during the month. See that all fly-infested fruits are destroyed, as they will only breed up further crops to destroy later ripening fruits.

Citrus orchards can be cyanided during the month for scale insects, and spraying for Maori with the sulphide of soda wash should be continued where necessary.

Mangoes can be budded during the month, as well as citrus and deciduous trees. Tropical fruit trees can be transplanted, taking care to choose dull weather and to cover same from the direct rays of the sun till they have become firmly established. Pines and bananas can still be planted.

THE TROPICAL COAST DISTRICTS.

Mangoes will be going off. See that they are not allowed to remain about on the ground to breed flies for the autumn crop of oranges. Longan, litchi, and other fruit are in season. As the month is often a very wet one, little cultivation can be done in the orchards. Strong undergrowth should, however, be kept down with a hoe or scythe. Tropical fruits of all sorts can be planted. Look out for Maori on citrus fruits, and spray when necessary.

THE SOUTHERN AND CENTRAL TABLELANDS.

January is a busy month in the Stanthorpe district, apples, pears, plums, peaches, and nectarines being in season. Do not gather the fruit too immature; at the same time, don't allow it to be over-ripe. Gather dry, handle carefully, grade and pack in attractive cases. Keep the fruit as cool as possible, and ship in well-ventilated cars. Keep a sharp lookout for fruitfly, and take every possible means to prevent its spreading, even going as far as to gather and destroy the whole of the fruit on

any infected trees, for if kept in check during the month, the bulk of the fruit ripening during February will be free.

Keep a sharp lookout also for codling moth; examine the bandages on the trees at least every ten days, and destroy all larvæ found therein; also gather and destroy all moth-infected fruit.

Gather Bartlett pears as soon as they are large enough, and store away in a cool shed to ripen; when they show signs of ripening, market, not before. If sent down green they will sell for cooking, and only fetch a small price. The right stage at which to gather is when the fruit is fully developed, and the flesh has lost its woody flavour, but is still quite hard. This is usually before the fly has stung it, and if gathered at this stage the fruit will ripen up properly without shrivelling, and develop its full flavour.

These remarks apply also to the Downs country, which is somewhat earlier than Stanthorpe.

The crop of the month in the Western tablelands is the grape; and the remarks I have made respecting this fruit when grown in the Southern Coast districts apply equally here. The fruit should be gathered dry, and wilted before it is packed. Too large cases are often used; cases holding from 20 to 30 lb., or crates holding six 6-lb. baskets, are preferable, the latter being the best package for shipping the fruit long distances. Keep the orchards well cultivated, and, where water for irrigation is available, give citrus trees a watering during the month, unless there has been a sufficient rainfall. When the orchard is irrigated, see that thorough cultivation follows the irrigation, so as to conserve the moisture in the soil.

Red scale, which is prevalent on citrus trees in the dry Western country, should be treated during the month. Cyaniding is the best remedy.

Farm and Garden Notes for January.

FIELD.—The main business of the field during this month will be ploughing and preparing the land for the potato and other future crops, and keeping all growing crops clean. Great care must be exercised in the selection of seed potatoes to ensure their not being affected by the Irish blight. Never allow weeds to seed. This may be unavoidable in the event of long-continued heavy rains, but every effort should be made to prevent the weeds coming to maturity. A little maize may still be sown for a late crop. Sow sorghum, imphee, Cape barley, vetches, panicum, teosinte, rye, and cowpeas. In some very early localities potatoes may be sown, but there is considerable risk in sowing during this month, and it may be looked upon merely as an experiment. Plant potatoes whole. Early-sown cotton will be in bloom.

KITCHEN GARDEN.—A first sowing of cabbages, cauliflower, and Brussels sprouts may now be made in a covered seed bed, which must be well watered and carefully protected from insect pests. Sow in narrow shallow drills; they will thus grow more sturdy, and will be easier to transplant than if they were sown broadcast. The main points to be attended to in this early sowing are shading and watering. Give the beds a good soaking every evening. Mulching and a slight dressing of salt will be found of great benefit. Mulch may consist of stable litter, straw,

grass, or dead leaves. Dig over all unoccupied land, and turn under all green refuse, as this forms a valuable manure. Turn over the heavy land, breaking the lumps roughly to improve the texture of the soil by exposure to the sun, wind, and rain. In favourable weather, sow French beans, cress, cauliflower, mustard, cabbage, celery, radish for autumn and winter use. Sow celery in shallow well-drained boxes or in small beds, which must be shaded till the plants are well up. Parsley may be sown in the same manner. Turnips, carrots, peas, and endive may also be sown, as well as a few cucumber and melon seeds for a late crop. The latter are, however, unlikely to succeed except in very favourable situations. Transplant any cabbages or cauliflowers which may be ready. We do not, however, advise such early planting of these vegetables, because the fly is most troublesome in February. For preference, we should defer sowing until March. Still, as "the early bird catches the worm," it is advisable to try and be first in the field with all vegetables, as prices then rule high. Cucumbers, melons, and marrows will be in full bearing, and all fruit as it ripens should be gathered, whether wanted or not, as the productiveness of the vines is decreased by the ripe fruit being left on them. Gather herbs for drying; also garlic, onions, and eschalots as the tops die down.

FLOWER GARDEN.—To make the flower-beds gay and attractive during the autumn and winter months is not a matter of great difficulty. Prepare a few shallow boxes. Make a compost, a great part of which should consist of rotten leaves. Fill the boxes with the compost; then sow thinly the seeds of annuals. Keep the surface of the soil moist, and when the young seedlings are large enough to handle lift them gently one by one with a knife or a zinc label—*never pull them up by hand*, as, by so doing, the tender rootlets are broken, and little soil will adhere to the roots. Prick them out into beds or boxes or very little soil containing plenty of leaf mould. Then keep a sharp lookout for slugs and caterpillars. Keep a supply of tobacco dust on hand, and scatter this in the path of the slug, and he will cease from troubling you.

All kinds of shrubby plants may be propagated by cuttings. Thus, pelargoniums, crotons, coleus, and many kinds of tropical foliage plants can be obtained from cuttings made this month. After putting out cuttings in a propagating frame, shade them with a piece of calico stretched over it. Be careful not to over-water at this season. Propagate verbenas, not forgetting to include the large scarlet Foxhunter. Verbenas require rich soil. Palms may be planted out this month. If the weather prove dry, shade all trees planted out. With seed boxes, mulch, shade, water, and kerosene spray, all of which imply a certain amount of morning and evening work, the flower garden in autumn and winter will present a charming sight, and will afford light and profitable work for girls with spare time on their hands.

An exhaustive booklet on "Flower Gardening for Amateurs" has been issued by the Department of Agriculture and Stock, and may be obtained from the Office. Price, 2s.

Another useful publication is "Market Gardening in Queensland." Price, 1s., also issued by the Department.

SEED TESTING.

Samples of any seeds purchased or offered for sale as seeds for sowing may be sent to the Department of Agriculture and Stock for examination.

WEIGHT OF SAMPLE TO MAIL.

Wheat, Oats, Barley, Maize, Rice, Rye, Peas, Cowpeas,	
Beans, Tares	8 oz.
Millet, Sorghum, Sudan Grass, Panicum, Buckwheat,	
Lucerne, Clover, Linseed	4 oz.
Rhodes, Paspalum	2 oz.
Turnip, Cabbage, Parsnip, Carrot, and Vegetable Seeds of	
like size	$\frac{1}{2}$ oz.
All Seeds other than those included above	2 oz.
Vegetable Seeds in made-up packets	3 packets

In the case of samples containing a large amount of Foreign Ingredients, it is advisable to send double the weight mentioned.

When drawing a sample be careful to obtain a quantity from the top, bottom, and middle of each bag. These should be thoroughly mixed to ensure the sample being uniform.

The name of the seed, quantity that the sample represents, also name and full address of the sender, should be on every sample.

If the result of the examination is required for purposes of sale, a fee of 2s. 6d. per sample will be charged.

No charge will be made to Farmers sending in samples of seed which they have purchased as seed for sowing, providing the following particulars are given:—

Vendor's name and address.

Name of seed.

Quantity purchased.

Date of delivery.

Locality where seed is to be sown.

Name and address of purchaser.

Samples, with covering letter, should be addressed to—

UNDER SECRETARY,

DEPARTMENT OF AGRICULTURE AND STOCK,
BRISBANE.

ASTRONOMICAL DATA FOR QUEENSLAND.

TIMES COMPUTED BY D. EGLINTON, F.R.A.S.

TIMES OF SUNRISE AND SUNSET. AT BRISBANE.									PHASES OF THE MOON, ECLIPSES, &c.	
(The times stated are for Queensland, New South Wales, and Victoria, where the clock time is identical).									H. M.	
1921.	JANUARY.		FEBRUARY.		MARCH.		APRIL.			
Date.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.		
1	4.57	6.45	5.22	6.42	5.41	6.20	5.58	5.46	9 Jan.	☉ New Moon 3 27 p.m.
2	4.58	6.45	5.22	6.41	5.41	6.19	5.58	5.45	17 "	☾ First Quarter 4 31 p.m.
3	4.59	6.45	5.23	6.41	5.42	6.18	5.59	5.44	24 "	☉ Full Moon 9 8 a.m.
4	4.59	6.46	5.24	6.40	5.43	6.17	5.59	5.43	31 "	☾ Last Quarter 6 2 a.m.
5	5.0	6.46	5.24	6.40	5.43	6.16	6.0	5.42	Apogee on 9th. Perigee on 23rd.	
6	5.1	6.46	5.25	6.39	5.44	6.15	6.0	5.41		
7	5.2	6.47	5.26	6.38	5.45	6.14	6.1	5.40	8 Feb.	☉ New Moon 10 37 p.m.
8	5.2	6.47	5.27	6.38	5.45	6.13	6.1	5.39	16 "	☾ First Quarter 4 53 a.m.
9	5.3	6.47	5.27	6.37	5.46	6.12	6.2	5.38	22 "	☉ Full Moon 7 33 p.m.
10	5.4	6.47	5.28	6.36	5.46	6.10	6.2	5.37	Apogee on 5th. Perigee on 21st.	
11	5.5	6.47	5.29	6.36	5.47	6.9	6.3	5.35		
12	5.5	6.47	5.30	6.35	5.47	6.8	6.3	5.34	1 Mar.	☾ Last Quarter abt. m'night
13	5.6	6.47	5.30	6.34	5.48	6.7	6.4	5.33	10 "	☉ New Moon 4 9 a.m.
14	5.7	6.47	5.31	6.33	5.48	6.6	6.4	5.32	17 "	☾ First Quarter 1 49 p.m.
15	5.8	6.47	5.32	6.33	5.49	6.5	6.5	5.31	24 "	☉ Full Moon 6 19 a.m.
16	5.9	6.47	5.32	6.32	5.49	6.4	6.5	5.30	31 "	☾ Last Quarter 7 13 p.m.
17	5.9	6.47	5.33	6.31	5.50	6.3	6.6	5.30	Apogee on 5th. Perigee 21st.	
18	5.16	6.47	5.34	6.30	5.50	6.2	6.6	5.29		
19	5.11	6.47	5.34	6.30	5.51	6.1	6.7	5.28	8 Apr.	☉ New Moon 7 5 p.m.
20	5.12	6.46	5.35	6.29	5.51	6.0	6.7	5.27	15 "	☾ First Quarter 8 12 p.m.
21	5.12	6.46	5.36	6.28	5.52	5.59	6.8	5.26	22 "	☉ Full Moon 5 50 p.m.
22	5.13	6.46	5.36	6.27	5.52	5.58	6.8	5.25	30 "	☾ Last Quarter 2 9 p.m.
23	5.14	6.45	5.37	6.26	5.53	5.57	6.9	5.24	Apogee on 2nd and 30th. Perigee on 17th at 3 p.m.	
24	5.15	6.45	5.38	6.25	5.53	5.56	6.9	5.23		
25	5.15	6.45	5.38	6.24	5.54	5.55	6.10	5.22		
26	5.16	6.44	5.39	6.23	5.54	5.53	6.10	5.21		
27	5.17	6.44	5.40	6.22	5.55	5.52	6.11	5.20		
28	5.18	6.44	5.40	6.21	5.55	5.51	6.11	5.20		
29	5.19	6.43	...	...	5.56	5.50	6.12	5.19		
30	5.20	6.43	...	...	5.56	5.49	6.12	5.18		
31	5.21	6.43	...	...	5.57	5.48	...	...

PHASES OF THE MOON,
ECLIPSES, &c.

(The times stated are for Queensland,
New South Wales, and Victoria, where the
clock time is identical).

H. M.

9 Jan. ☉ New Moon 3 27 p.m.

17 " ☾ First Quarter 4 31 p.m.

24 " ☉ Full Moon 9 8 a.m.

31 " ☾ Last Quarter 6 2 a.m.

Apogee on 9th. Perigee on 23rd.

8 Feb. ☉ New Moon 10 37 p.m.

16 " ☾ First Quarter 4 53 a.m.

22 " ☉ Full Moon 7 33 p.m.

Apogee on 5th. Perigee on 21st.

1 Mar. ☾ Last Quarter abt. m'night

10 " ☉ New Moon 4 9 a.m.

17 " ☾ First Quarter 1 49 p.m.

24 " ☉ Full Moon 6 19 a.m.

31 " ☾ Last Quarter 7 13 p.m.

Apogee on 5th. Perigee 21st.

8 Apr. ☉ New Moon 7 5 p.m.

15 " ☾ First Quarter 8 12 p.m.

22 " ☉ Full Moon 5 50 p.m.

30 " ☾ Last Quarter 2 9 p.m.

Apogee on 2nd and 30th. Perigee on 17th at 3 p.m.

ECLIPSES.

An Annular Eclipse of the Sun visible in North of Scotland but not in Australia will occur on April 8th.

An Eclipse of the Moon will occur on April 22nd, when the Moon will rise totally eclipsed.

The Planets Venus, Mars, and Uranus will be remarkably close together apparently on January 9th, and will form a fine celestial picture with the Moon on the 13th.

For places west of Brisbane, but nearly on the same parallel of latitude—27½ degrees S.—add 4 minutes for each degree of longitude. For example, at Toowoomba the sun would rise about 4 minutes later than at Brisbane if it were not for its higher elevation, and at Oontoo (longitude 141 degrees E.) about 48 minutes later.

At St. George, Cunnamulla, and Thargomindah the times of sunrise and sunset will be about 18 m., 30 m., and 38 minutes respectively, later than at Brisbane.

The moonlight nights for each month can best be ascertained by noticing the dates when the moon will be in the first quarter and when full. In the latter case the moon will rise somewhat about the time the sun sets, and the moonlight then extends all through the night; when at the first quarter the moon rises somewhere about six hours before the sun sets, and it is moonlight only till about midnight. After full moon it will be later each evening before it rises, and when in the last quarter it will not generally rise till after midnight.

It must be remembered that the times referred to are only roughly approximate, as the relative positions of the sun and moon vary considerably.

[All the particulars on this page were computed for this Journal, and should not be reproduced without acknowledgment.]

Nature's Fertiliser



*Seabird
Phosphates*

HOLBOURNE ISLAND PHOSPHATES.

ANALYSIS: 17% Phosphoric Acid.
20% Lime.

Phosphoric Acid is an essential plant food ingredient, and is required to maintain the soil's fertility. Lime promotes the decomposition of all kinds of vegetable matter into humus, and makes the soil more porous, warmer and sweeter, largely increasing its value and fertility.

The Phosphates obtained from Holbourne Island *is a natural seabird manure*, and has been used in Queensland and New South Wales for several years, and now figures prominently in local agriculture.

WRITE FOR PRICE LIST AND FREE BOOKLET !

"BE WISE — FERTILISE !"

**AUSTRALIAN CO-OPERATIVE FERTILISERS LTD.,
Roma Street, Brisbane.**

Government State Farms.

Stud Notices, &c.

Kairi (N.Q.) Stock.

Orders taken for supply, as available, of Six Months Old Jersey Pedigree Bull Calves, from high-class registered animals.

Warren (Q.C.R.) Stock.

Orders taken for supply, as available, of Six Months Old Ayrshire Pedigree Bull Calves, from high-class registered animals.

PIGS:—Berkshires, Young Boars and Sows for Sale.

Applications to "THE MANAGER,"

Souvenirs and Gifts

in
Jewellery, Gems,
Sterling Silver and
Electroplate Ware,
China, etc.

JEWELLERY REPAIRS A SPECIALTY.

Fraser's Limited,

Art Jewellers,
142 Queen Street,
BRISBANE.

E. L. THOMSON, MANAGING DIRECTOR.

Telephone—Central 2557.

King's Pearcide

Wm. W. King's Pearcide kills Prickly Pear, Nut Grass, Sida Retusa, Lantana, Bathurst Burr, Thistles, and all other Noxious Weeds.

CHEAP AND EFFECTIVE.

To Kill Prickly Pear, inject 1 to 50, or spray 1 to 150, according to nature and age of pear; and at all times spray after injecting.

To Kill Nut Grass, spray 1 to 150 (rake with strong, heavy rake before spraying).

To Kill Sida Retusa, &c., spray 1 to 200. It is the strongest specific now in use, and should never be used in its crude state as it is very poisonous.

For Killing Trees, feather well into sap, or bore 3 holes on an angle of 30 deg. south to the centre, then fill the holes with Pearcide in its crude form, then plug holes with clay, and the Pearcide will do the rest.

If you add a greater quantity of water than specified above to the gallon of Pearcide, spray more freely to attain the same results.

Can be applied with any spray on the market.

5 Gallon Drums, 52s. 6d.

1 Gallon Tins, 13s.

1/2 " Tins 7s. 9d.

Bottles (large) 2s. 6d.

G. Horsburgh & Co. Ltd., Sole Agents,
Hardware Merchants, Maryborough, Qld.

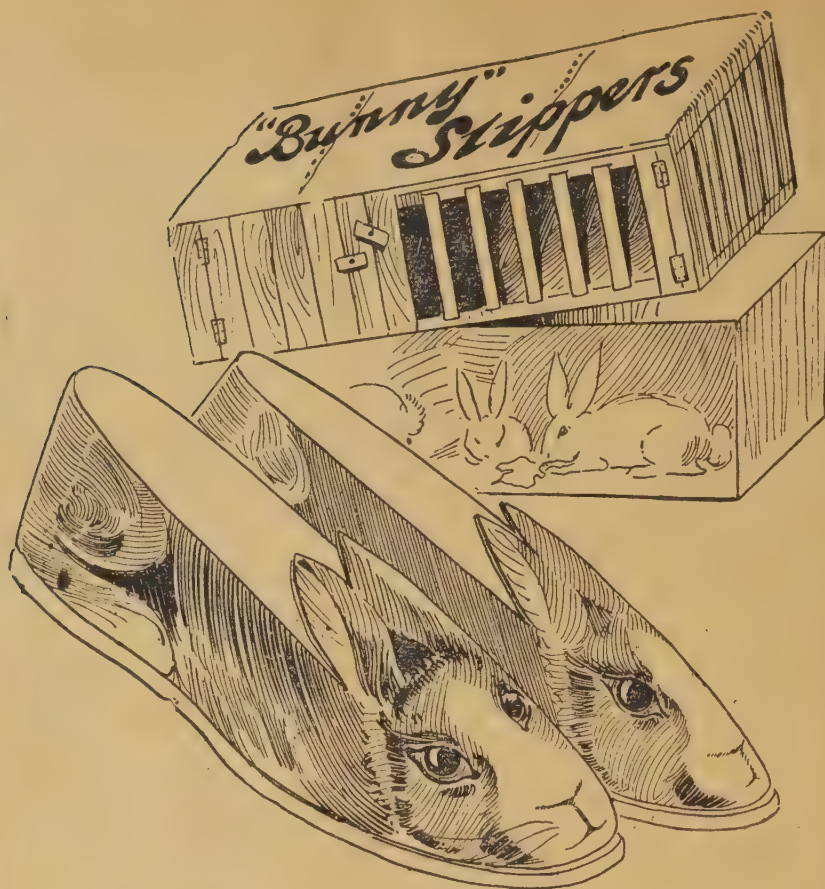


Specials! Farm Seeds, Now.

Maize (9 varieties), 470 Bags (including Champion Yellow and Prize 90 Day), Millets (7 varieties), Sorghums (6), Sudan Grass, local, graded (test 95%).

Write for full list

Walsh & Co., Agricultural Seedsmen, Toowoomba.



Bunny Slippers 5/11 Pair.

—These “BUNNY SLIPPERS” are just the cutest little things we’ve seen in Children’s Slippers; and they are ever so dainty and winning. Little girls’ hearts will palpitate with joy at the very thought of getting a pair of them. They’re winning everybody’s hearts.

—They are made of prepared Felt, with nice thick soles, which makes them ever so cosy and comfy; and on each slipper is the head of a bright little “Bunny Rabbit” printed in colours. Each pair is packed in a box, which is painted, and cut in the shape of a rabbit house with window, bars, and all, and into this cage you can be sure that Miss Little Girl will put her Bunny Slippers, each time she takes them off her feet, which means that she is going to take great care of them.

—Sizes 7 to 1. Price **5/11** pair, Post Free.

—Get a pair for your Little Girl to-day. They make splendid gifts!

5/11
Pair.

T. C. Beirne & Co. Ltd.,
THE VALLEY, BRISBANE.



To the MAN on the LAND!

Why not sign an order for
a Year's Subscription to the

Queensland Agricultural
Journal?

It is only 1/- to You!
To all others, it is 10/-!!

For Particulars see Order Form page XVII.

A Real Live Monthly

The Journal will help You to develop
Your Mind, Your Land, Your
Prospects, and also Your State.

Queensland Government Savings Bank.

ADVANCES TO SETTLERS.

The Bank is prepared to Help the
Man on the Land!

**LOANS up to
£1,200**

(Subject to Security
being sufficient.)

to carry out Improvements;
to purchase Stock, Machinery, &c.;
to pay off Mortgages or Purchase Money;
for General Purposes.

SECURITY

taken over Freeholds or Selections.

INTEREST

5% per Annum.

TERM

25 years. No redemption for first 5 years:
Interest only.

REPAYMENTS

Half-Yearly Instalments (£4 0s. 3d. per £100)
covering Interest and Redemption.

FEES

£3 for Inspection; and Out-of-pocket Expenses
for Registration of Securities.

WORKERS' DWELLINGS.

**LOANS up to
£800**

for the Erection of Dwellings on the Security of
the Land and Improvements.

INTEREST

5% per Annum.

REPAYMENTS

Monthly Instalments (13/3 per £100).

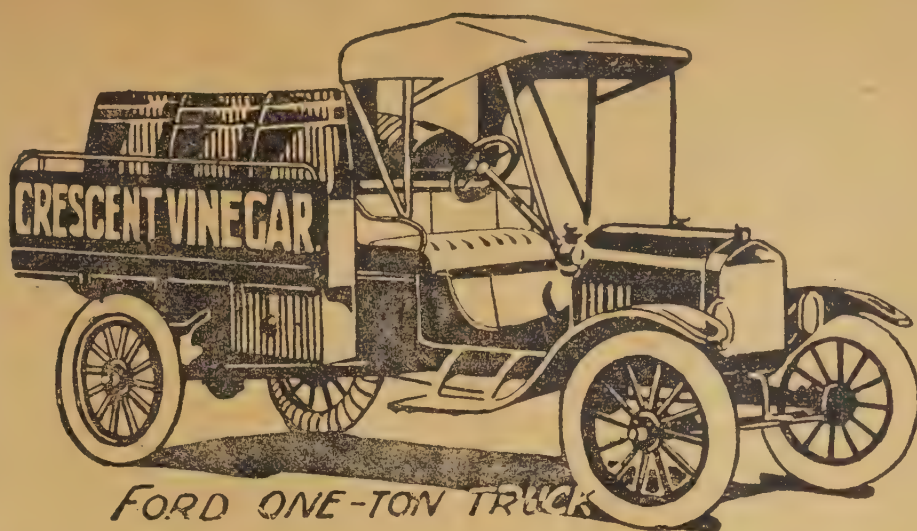
TERM

20 years.

FEES

£3 for Inspection; and Out-of-pocket Expenses
for Registration of Securities.

For Full Particulars apply to
THE COMMISSIONER, BRISBANE,
or to any Branch or Agency of the Bank, or at the
Office of any Land Commissioner, Land Agent,
or Clerk of Petty Sessions.



—then he woke up!

It takes a terrible jolt to shake some men out of settled business habits, ideas, and ways of doing things—to make them see all round them the forces that lessen Production and Profits!



One ton truck does the work of 5 men, 5 horses, 5 carts, delivers one ton of goods one mile in three minutes at a cost of 3d.—Say how-de-do over the wire—5155, and we'll gladly come over!


Queensland Motors Ltd.



Adelaide Street : : : Brisbane




MEGGITT LIMITED'S





PURE LINSEED MEAL

Meggitt Limited have much pleasure in announcing that they are now able to accommodate orders for famous  Linseed Oil Meal.

Although  Linseed Meal will be supplied identical in quality with that which established "The Standard of Quality" in the past, we strongly recommend all owners of stock to advance with science, and use our  Specialised Stock Foods to obtain maximum results.

 Stock Foods are scientifically balanced rations compounded on a basis of our famous  Linseed Oil Meal and contain the correct proportions of Protein, Carbohydrates, and Fats. Our  Specialised Stock Foods are blended to suit the exact requirements of all classes of Stock, and **must** give results.

All Stock Foods carry our  guarantee which is the "Standard of Quality."

Write for Booklet on Scientific Feeding to  Stock Foods Department, C.Q.



AGENT:—

MESSRS. R. S. EXTON & CO., LIMITED,
QUEEN STREET, BRISBANE.



"The boy on the bag
guarantees quality"

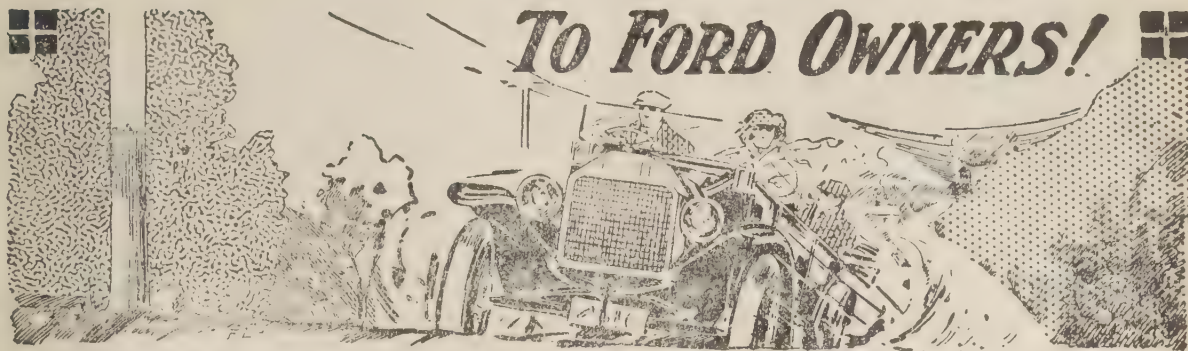
Meggitt Limited

HEAD OFFICE 26 KING ST SYDNEY (Works: Parramatta)



"The boy on the bag
guarantees quality"

Manufacturers of Linseed Oil, Cake, Meal and Specialised Stock Foods



HERE IS YOUR OPPORTUNITY

to reduce cost of tyre upkeep. No tyre does better work on a Ford than a Dunlop, and few as good. We illustrate half thickness of a "Ford Special"

DUNLOP

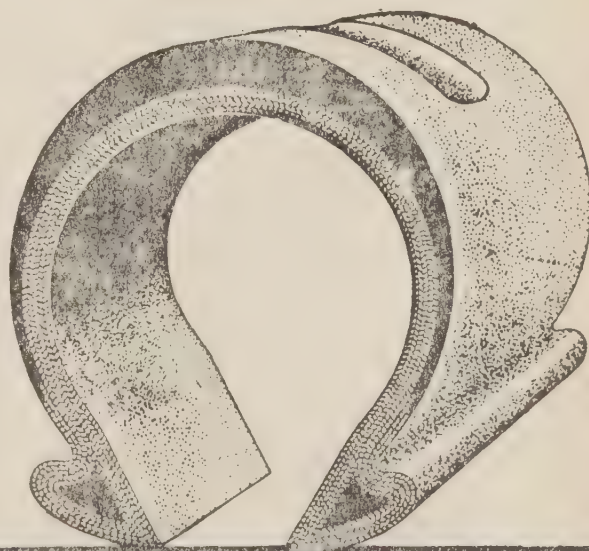
30" x 3½"

high-grade 5-ply cover, that is now listed at

£6 6s.

There's nothing to equal it for value and service in Australia. Compare the price with other 30 in. x 3½ in. Covers—there's no need to compare the quality, for motorists throughout Australasia know and appreciate Dunlop quality and Dunlop service. This Cover is now obtainable through your garage.

DUNLOP RUBBER CO.
ALL STATES AND N.Z.



Brisbane House:

268-74 Adelaide Street.



WITH



"His Master's Voice" Instrument

*and "His Master's Voice" Records
you hear the World's Greatest Artists
just as they wish to be heard*

Your interpretation of a piece of music may be in itself a highly artistic achievement, but not if super-imposed on the interpretation of a master. It then would be neither one thing nor the other.

"His Master's Voice" Instruments are equipped with doors, so that the volume of tone may be regulated to suit varying conditions. They are not intended to be used in imposing amateur "interpretations" upon those of the world's greatest artists, for that would be to lose the very thing you seek—the finest known interpretations of music.



A "His Master's Voice" Record of **Caruso** is **Caruso** himself—provided always that some less qualified person shall not tamper with what the artist himself has done.

*Call or write to-day for Illustrated Catalogues
sent Post Free on request.*

*Our Easy Payment System brings the purchase
of a "His Master's Voice" Instrument within
the reach of all.*

Palings

86-88 Queen St.

Brisbane

and at Toowoomba and Rockhampton

ANNOUNCEMENT

TO THE
CANEGROWERS
FRUITGROWERS
 AND
AGRICULTURISTS
OF QUEENSLAND

Gibbs, Bright & Co., Brisbane,

beg to announce that they have been appointed distributing agents for Queensland for the

Sulphide Corporation Ltd.,

who at their immense works at COCKLE CREEK, near Newcastle, N.S.W., are now manufacturing

High Grade Fertilisers of all descriptions, including the following:—

Superphosphate	Sulphate of Ammonia
Nitro Super	Bone & Super Mixed
Special A. I. Cane Fertiliser	Orchard Manure
Maize & Fodder Crop Manure	Root Crop Manure
Potato Manure	Leguminous Manure
etc., etc., etc.	

POTASH.—Notwithstanding the fact that since the commencement of the War Potash has been practically unobtainable in Australia, we are pleased to be able to state that the Sulphide Corporation are in the unique position of being able to supply this important plant food, and **Potash is included in their Cane Fertiliser, Orchard Manure, Maize and Fodder Crop Manure, Root Crop Manure, Potato Manure, and Leguminous Manure.**

We invite correspondence and shall be pleased to supply further information and advice to all those interested in maintaining the fertility of their soil.

All Communications should be addressed to—

Gibbs, Bright & Co.,

107-109 Eagle Street, Brisbane.

THE

UNITED INSURANCE COMPANY, LTD.

PURELY AUSTRALIAN.

Give this Company your FIRE, MARINE, and ACCIDENT Insurance Business.

AGENTS EVERYWHERE. Offices at Brisbane, Rockhampton, and Townsville.

ERNEST WICKHAM, *Manager for Queensland.*

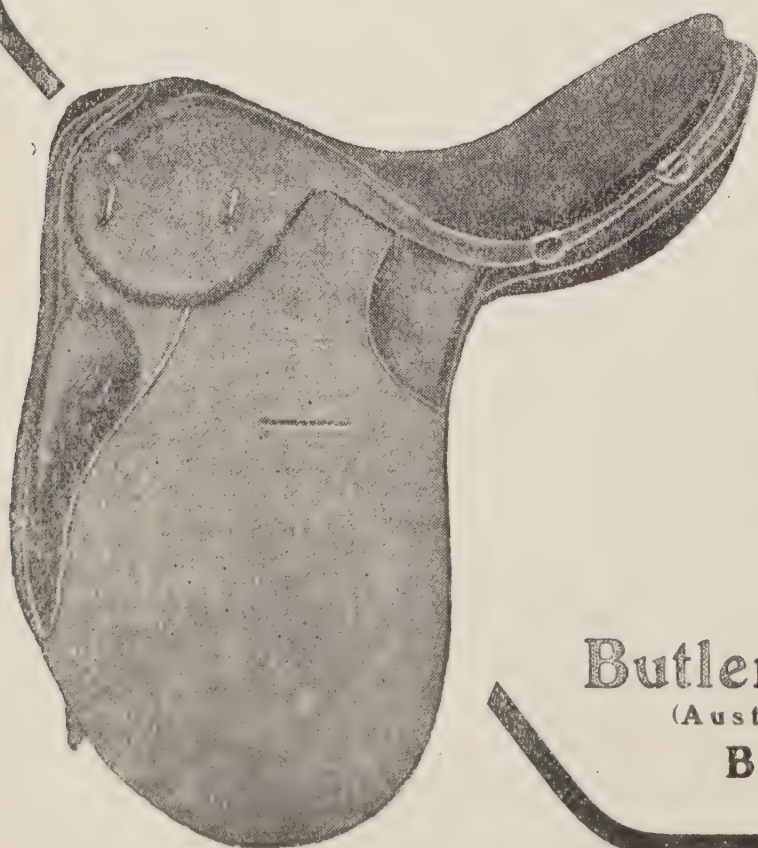
Make Your Own Cough Mixture and Save Much Money.

In homes where families are large and incomes small the following recipe for making Cough Mixture will prove a veritable boon because of the curative goodness of the mixture produced and the saving in money that it effects:—

Pour a large breakfastcupful of warm water into a jug and in it dissolve three tablespoonfuls of treacle or honey and four tablespoonfuls of sugar. (If treacle or honey are not on hand use double quantity of sugar.) When cool, add two tablespoonfuls of vinegar and a phial of Heenzo, and pour into a large, clean, tightly-corked bottle, ready for use as required. Full directions for taking will be found with the Heenzo, which may be obtained from any chemist or store for 2s. As the above recipe produces a family supply of cough mixture, which, if bought in a lot of little bottles, would cost anything up to 30s., according to quality, it will be readily seen that a big saving is to be effected in making Heenzo Cough Mixture. As Heenzo does not contain any paregoric, laudanum, or other opium extracts, it may be given to little children without fear of harmful effects.

Use Hean's Tonic Nerve Nuts when you feel run down.

KEY-HEADS



Are made Anglo Style as well as Stock. Half a ton stronger in the gullet than ordinary Saddles—and do not spread. Longer life and greater comfort without extra cost. Write to-day for free booklet and catalogue.

Butler Brothers
(Australia Limited),
Brisbane.

Shorthand Students Surprised !

A FREMANTLE (W.A.) student of Bradshaw's 26:6:26 Shorthand was so pleased at the simplicity of the system that he wrote as follows :—

"The books containing the first and second theory lessons, I take it, are only the 'Two Specimen Lessons' which you advertise as sent 'Free on Application.'

"If my presumption is correct, and the books you sent me are only 'Specimen Lessons,' please send on the proper instruction books.

"I might say that the lessons in the book seem too simple to be the actual instructions. I am quite satisfied that the Course is an excellent and simple one, judging from what I have gathered."

He had actually worked the First Two Lessons, and could not believe it was so ! They seemed "too simple to be the Actual Instructions!"

Another student, after only a fortnight's study, writes as follows :—

"This morning I wrote out a whole speech, and read it back without any trouble to another person, a couple of hours later. Not too bad for a start, is it ?"

Still another enthusiastically reports progress as follows :—

"I reckon this A1. After a time it comes easy to write the words, and they are quite easy to read back. I found I was working the little problems out after a short time WITHOUT THINKING about them. I start BOOK FOUR TO-MORROW."

SHORTHAND "WITHOUT THINKING"

is the pinnacle of success in the "Winged Art." With that condition of mind, what is to hinder HIGH SPEED ?

Still another (Miss Ida Killey, Hampton Street, Northam, W.A.) writes :—

"I would like to take this opportunity of saying how much I appreciate your system of Shorthand, the theory of which I learnt in my spare time, spread over a period of ten weeks. No doubt had it not been that I could only give my spare time, I should have learnt it in three weeks. My average speed is, when writing from memory, 120 words per minute, and writing from dictation, 80 words per minute. This is rapidly increasing.

"Your printed Course is so simple, yet so complete, that no assistance of any kind is necessary."

YOUR doubts as to the possibility of learning Shorthand in a few weeks will vanish if you will take the trouble to investigate. To anyone mentioning "Queensland Agricultural Journal," and enclosing 3 penny stamps to cover postage, TWO of the five LESSONS will be sent FREE.

BRADSHAW'S
BUSINESS COLLEGE
— PTY. LTD. —

BRADSHAW'S CHAMBERS,
246-50 FLINDERS STREET,
MELBOURNE, VICTORIA.

↓

**FINNEYS
PAY
THE
CARRIAGE.**

↑



**Finneys
for
Greatest
Variety
and
Best
Values.**

Gift Suggestions for "Dad."

Gift Shirts and Pyjamas.

Men's Cheffoo Silk Collar and Pocket Shirts, Tussore shade, nice even weaves. Sizes 14-17 in. 27/6 each.

Men's Plain Fuji Silk Collar and Pocket Shirts, good strong quality, best make and finish. Sizes 14-17 in. 32/6 each.

Men's Tourist Shirts made with soft Double Cuffs and Collar to match. Sizes 14-17 in. of White Jap. Silks 30/- each.

Men's Cheffo Silk Tourist Shirts, Tussore shade, made with Double Cuffs and Soft Double Collar to match. Sizes 14-17 in. 30/- each.

Men's Fuji Silk Tourist Shirts, with Collar to match, natural shade, good wearing qualities. Sizes 14-17 in. 35/- each.

Men's Striped Fuji Silk Shirts, Tourist Style, with Collar to match, newest designs. Sizes 14-17 in. 45/- each.

Men's Natural Shade Fuji Silk Pyjamas, reliable qualities, best possible make and finish. Sizes S.M., M., and O.S. 58/6, 63/- Suit.

Men's Striped Fuji Silk Pyjama Suits, good heavy qualities, newest Pyjama designs. Sizes S.M., M., O.S. 75/- Suit.

Men's Pyjamas, made of good quality, highly Mercerised Cotton materials, newest Pyjama designs of Black, Blue, Grey, and Helio on White Grounds. Sizes S.M., M., O.S. 30/-, 35/-, 42/- Suit.

Gift Ties.

Men's Broadway Ties, in dark shades in Poplin, with small white design 2/6, 3/6.

Striped designs, Black and White, and Black and Grey 2/6, 3/6, 4/6, 5/6.

Dark fancy designs, Dark Grounds, small fancy designs, Greys, Browns, Navys 4/11, 5/11, 6/11.

All Silk, Fancy, specially selected, Medium and Dark Colours, with fancy designs 6/11, 7/6, 8/11, 10/6, 12/6.

Special Presentation Quality, All Silk, assorted dark fancy floral designs 10/6, 12/6, 13/6.

Dark Fancy Broadways, 3 in., Fancy Box 10/6, 12/6, 15/-, 17/6, 20/-, to 35/-.

Gift Handkerchiefs.

Gent's Silk Handkerchiefs, in plain White Hemstitched; White, with plain coloured borders 7/6 each.

White, with fancy Navy Borders 7/6 each.

All dark fancy designs, Breast Pocket Size 5/6, 7/6, 10/6, 13/6.

Gent's Handkerchiefs (each dozen in Fancy Box). Plain White Lawn Per dozen, 9/6, 11/6, 14/6, 17/-, 20/-.

Plain White Lawn, Hemstitched Per dozen, 8/6, 11/6, 17/6, 22/6.

Plain White. All Linen, Hemstitched 2/11, 3/6 each.

Finney, Isles & Co., Ltd.,

The Drapers of Queensland,

"The Big Block"

- - -

Brisbane.

Treatment for Lung Worms in Calves

(Commonly called Hoose or Husk).

The most reliable method is to make an injection into the windpipe, as recommended by the Stock Department. We supply suitable Syringes, with two curved needles, also the injection (in bottles containing 4 doses each).

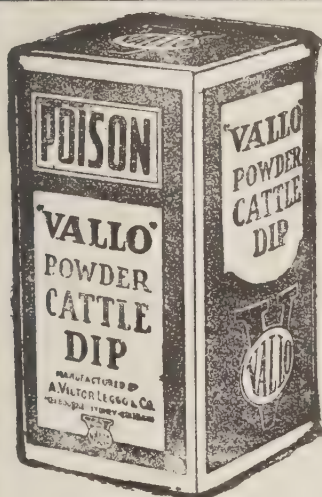


Price of Syringe (with two Curved Needles)	18	6
Injection (in bottles containing four doses each)	2	0
Postage	...	0 9
Outfit Complete	...	<u>£1 1 3</u>

Surgical Supplies Ltd.

(F. G. Prosser, Gen. Manager),

246 Queen Street, Brisbane.



Do YOU Recognise It!

"VALLO" has become the Standard Dipping Preparation—the Quickest, Surest, and Safest Dip on the market. If *you* feel that *you* would like more satisfaction, greater assurance of satisfactory results—*Cleaner Cattle*, then "VALLO" is the dip which you should use.

VALLO^{POWDER} CATTLE DIP

will give you the fullest measure of protection from both the Tick and Scalding. "VALLO" has merits which you cannot afford to over-look. It is absolutely homogeneous, with a high degree of "*Wettability*," is easily mixed, economical and thoroughly efficacious. Every claim for "VALLO" can be substantiated by performance records.

Officially approved as a suitable concentrate by the Queensland and New South Wales Government Stock Departments.



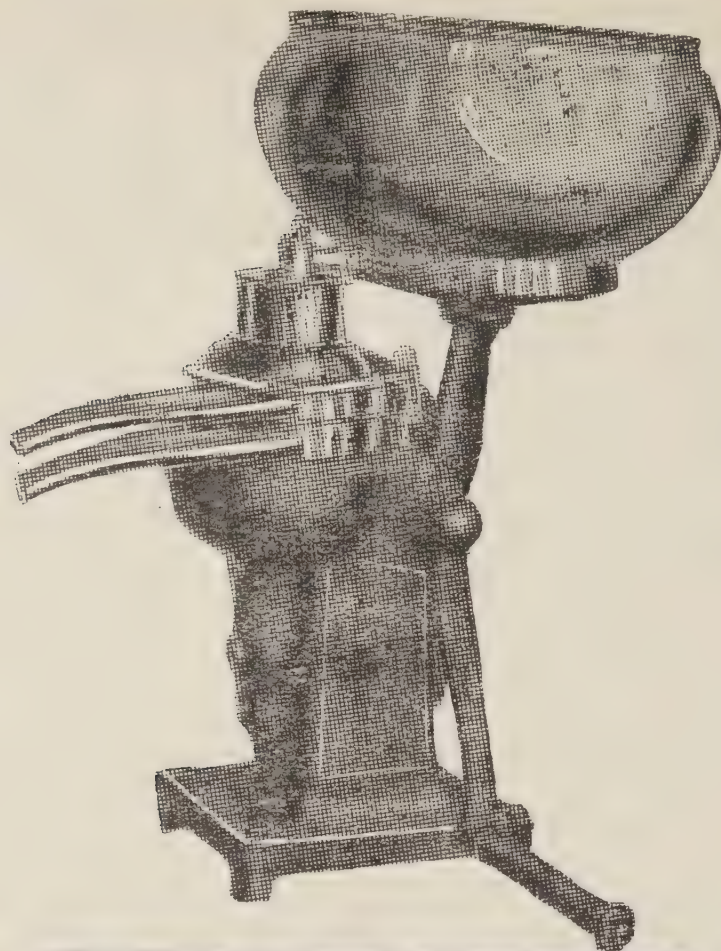
A. Victor Leggo & Co.

Melbourne

Sydney

Brisbane

Obtainable
all
Stores.



ON A PINNACLE OF FAME!

TWO ACHIEVEMENTS.

The "Baltic" Separator has scaled the heights of fame through solid but brilliant merit. Solid, because it is faithfully built for long, economical, and satisfactory service; brilliant, because of its remarkable achievements as a peerless skimmer, which is only possible on account of the special attachments to the discs in the "Baltic" Bowl, which abolish profit-eating losses.

The "Simplex" Milking Plant makes Dairying a much more pleasant occupation. Time is saved; drudgery cut out; cows are satisfied; you are satisfied, because of an easier life, and if you want to make the most money out of your dairy, you can double your herd without doubling your expenses for labour, as would happen with hand milking.

The "Simplex" is the Sanitary Machine, and that is essential for success in machine milking

Get particulars of the Twin Success builders—

**The "BALTIC" Separator and the
"SIMPLEX" Milking Machine.**

The "BALTIC" Separator Co., Ltd.

(Desk "F"),

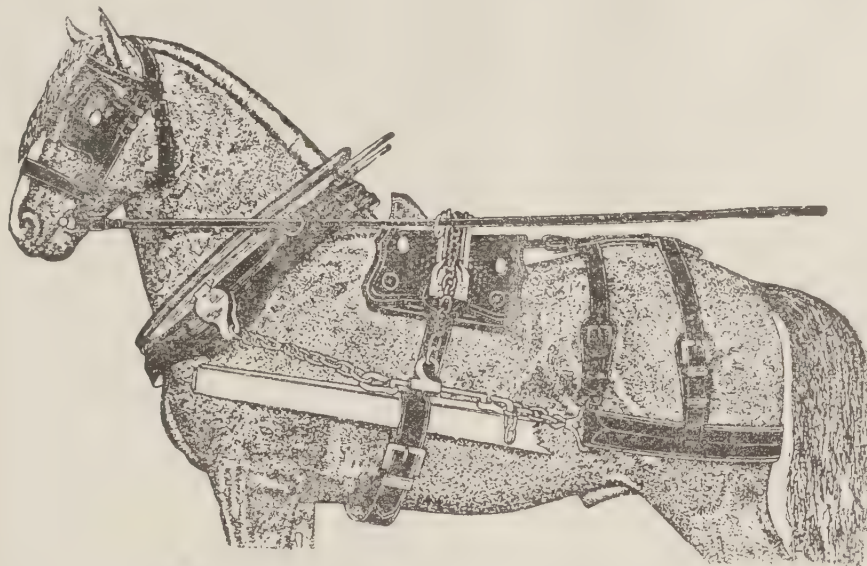
18 Roma Street

BRISBANE.

C. & F.

Saddlery and Accessories

Our Saddlery and Accessories Department is known amongst all Agriculturalists in Queensland. They have explicit faith in our experienced men of this Department who understand their wants in anything from Whips to Harness.



F/C 6.—Dray Harness, Brown, 3in. Breechen Seat, Japan Buckle, 3-row sown $2\frac{1}{4}$ hip straps. C. & F.'s Price, £11/5/-.
Spring Cart Harness, Brown, 2in. Breechen Seat, 2-row sewn $1\frac{1}{4}$ hip strap. C. & F.'s Price, £11/10/-.

Other Values:

F/C 7.—Dray Collars up to 21in. C. & F.'s Price, 30/- Nett. For Strength, Durability and well-sewn Harness, C. & F.'s Goods stand alone.

F/C 9.—Dray Saddle. C. & F.'s Prices, Small, £3/2/6 Medium, £3/10/-; Large, £3/15/-.

F/C 10.—Hard wearing Buggy Collars, Seamed. C. & F.'s Price, 24/6 each.

F/C 11.—Smart Patent Leather Buggy Saddles, fitted with Alexander Bead. C. & F.'s Price, 35/-. Without Bead, 32/6. This Harness may be had in Brown Leather at the Same Price.

Write Now for General Catalogue

Sent Post Free on Request to any address.

Cribb & Foote

The Universal
Providers
By Mail

Ipswich

Where Thousands
Shop
By Post

State
Produce
Agency

BAGS

*All Descriptions Stocked
and Purchased*

FERTILISERS

*Natural Guano
Bone and Guano*

Prices on Application

Auction Sales Daily
of all Produce Lines

Office, Turbot Street; Telephone, Central 5997.

Storeman, Turbot Street; Telephone, Central 5998.

**Fruit, Egg, and Poultry Department;
Telephone, Central 6158.**

Bag Department; Telephone, Central 4245.

Queensland Agricultural College.

POULTRY.

The following Breeds are available:—Brown Leghorn, White Leghorn, Indian Game, Black Orpington, Silver-Laced Wyandotte, Rhode Island Reds.

Prices:

Cockerels—15s. to 42s.

Pairs—Cockerel and Pullet, 30s. to 63s.

Trios—Cockerel and two Pullets, 63s. to 105s.

} f.o.r. Gatton.

Available from January to August.

Prices vary according to quality. Unless crates are returned promptly, an extra charge of 2s. for a single bird and 1s. for each additional bird will be incurred.

Settings of eggs of the above breeds are available from 1st July up to 30th November. Price, 10s. to 21s. per setting, f.o.r. Gatton. Nine eggs in each setting guaranteed fertile. Should less than nine prove to be fertile, the infertiles will be replaced, if returned, carriage paid and unbroken.

(N.B.—An infertile egg is uniformly translucent when held up to a strong light. Settings should be allowed to settle twenty-four hours before being placed under the hen.)

DAIRY STOCK.

Young Bulls of the following Breeds for Sale:—Ayrshires, Jerseys, Holsteins, Guernseys, at prices from 15 to 40 guineas each, f.o.b. Gatton.

PIGS.

Berkshires and Middle Yorkshires.

Boars—10 to 12 weeks old—£4 to £5 each.

Sows—10 to 12 weeks old—£3 10s. each.

All prices f.o.r. Gatton.

FOR SERVICE.

Clydesdale Stallion—PROSPERO (imp.). Season, 1st October to 31st January.

Service Fee, £3 3s. per mare and 1s. 6d. per week agistment.

Full particulars on application.

Dairy Cows are taken for service by Ayrshire, Jersey, Holstein, or Guernsey Bulls.

Service Fee, 10s. per cow; Agistment, 1s. per week.

CUTHBERT POTTS, B.A., Principal.

Persons desiring to communicate with the Queensland Agricultural College and State Farms are requested to address their correspondence to the Principal of the College, Gatton, and to the Managers of the State Farms. The State Farms are: Hermitage (Warwick), Gindie (via Springsure), Warren (Stanwell), Bungeworgorai (Roma), Kairi North P.O.

It is notified, for the information of intending Visitors to the Queensland Agricultural College, that the Second Wednesday in each month has been set apart for the reception of Parties of Farmers and others desirous of inspecting the Institution. Supplies of hot water and milk can be obtained at the College, if desired.

—| The |— Forster Engineering Works

SPEAKING OF REPAIRS?

We Specialise in Repairs of every description, particularly Machine-cut Gears in Iron, Steel, Gun Metal, Raw-hide, etc,

Horse and Cattle Brands made; also Ploughs and Ploughshares made and repaired.

Inquiries for any class of Machinery will receive prompt and special attention.

WRITE FOR PARTICULARS.

Forster Engineering Works Ltd.,

ENGINEERS AND BLACKSMITHS,

Mary Street (between George and Albert Streets), BRISBANE.

A Good Whip for Xmas

KOO-KOO-KOO-KOO

K'BURRA WHIPS



A K'burra Stock Whip is a most Acceptable Present

They are Expert Plaited and Kangaroo Leather right through

	6 ft. 7 ft. 8 ft. 9 ft.	
THONGS, 12 plait—17/-, 19/6, 22/6, 24/6.		HANDLES to match—16 plait 16/6, 24 plait
„ 16 plait—19/-, 22/-, 25/-, 28/-.		18/6, 32 plait 21/6. If for 9 ft. thongs add
„ 20 plait—23/6, 27/-, 31/-, 35/-.		1/6 for loading.

Here are Three Christmas Specials

Our Nigger Whip, 20 plait 8 ft. thong, with handle in black kangaroo, 55/-; *An Uncommon Whip.* Fancy Plaited Stock Whip, 20 plait 8 ft. thong with handle in black and tan or all tan kangaroo, 70/-. Extra Special, 24 plait 7 ft. thong, with 60 plait handle in tan kangaroo—a fine piece of workmanship, 82/6.

IT PAYS
TO BUY
THE BEST

All the above Post Free for Cash with Order

Walther & Stevenson, Ltd., ^{SADDLERS,} 393 George St., Sydney

Departmental Announcements.

IT is hereby notified that the "Journal" will be supplied to all members of Agricultural and Horticultural Societies in Queensland who do not derive their livelihood solely from the land, on payment, in advance, of an annual subscription of 5s., which will include postage. Queensland Schools of Arts will be supplied at the same rate. Persons resident in Queensland whose main source of income is from Agricultural, Pastoral, or Horticultural pursuits, which fact should be stated on the attached Order Form, will receive the "Journal" free

ON PREPAYMENT OF 1s. PER ANNUM, to cover postage.

To all other persons the annual subscription will be 10s., which will include postage.

All remittances should be made by postal notes or money orders, but where they are unobtainable stamps will be accepted, though the Department accepts no responsibility for any loss due to the latter mode of remittance.

For your convenience an Order Form is attached. A cross on each side of the Order Form indicates to the recipient that his subscription is again due. Watch also the wrappers on the "Journal." The figures alongside the address serve as a receipt, and they also indicate when the subscription expires—thus, "9/17" means that subscription expires with the copy of the ninth (September) month in the year 1917.

Amount of one year's subscription should be forwarded with Order Form before the 15th of the month to the Under Secretary, Department of Agriculture and Stock, Brisbane.

All new subscriptions or renewals received for the "Journal" after the tenth day of the month will commence with the month after that on which the subscription is received. Previous copies available will be supplied at 6d. per copy to subscribers only. To all others 1s. per copy.

The Editor will be glad to receive any papers of special merit which may be read at meetings of Agricultural and Pastoral Associations in Queensland, reserving, however, the right to decide whether their value and importance will justify their publication.

ORDER FORM.



From

Name.....

Please
write
Plainly.

Postal Address.....

**To the Under Secretary,
Department of Agriculture and Stock, Brisbane.**

For the enclosed..... please forward
me the "Queensland Agricultural Journal" for year.

My main source of Income is from.....

State whether "renewal" }
or "new subscriber" }

NOTE.—Subscribers who wish to obtain the Journal for the month when the subscription is sent, must apply before the fifteenth of that month.

Secretaries of Associations are requested to be good enough to forward to the Editor, as early as possible, the dates of forthcoming Shows, as it is important in the interests of the Associations that these dates should be published. Changes in dates must also be promptly advised.

It is equally necessary that prompt notice be given to the Editor of changes in the Secretaryship of any Society or Association, a matter which is much neglected. Furthermore, information concerning dates on which shows are to be held must be forwarded to the Editor at least six weeks before the Show date. If these suggestions are not complied with, the Society whose Secretary neglects to supply the required information will be liable to be struck off the list of Societies published in the "Journal."

To enable recipients of the "Queensland Agricultural Journal" to have the half-yearly volume bound, Covers in Boards and Cloth will be supplied from this Office on application to the Under Secretary for Agriculture. Applications must be accompanied by a remittance to cover cost. Covers will be supplied at **One Shilling and One Shilling and Ninepence** each.

In order to avoid disappointment, correspondents who wish for replies to questions in the Journal are requested to note that it is imperative that all matter for publication on the first day of any month should reach the Editor by the 15th of the previous month.

We would ask our Subscribers to note that, when their Subscription has run out, a Cross is placed against the Order Form. It often happens that this intimation is disregarded, with the result that the "Journal" is not posted to the Subscriber. The Department cannot guarantee to supply back numbers in such cases.

Pamphlets on different subjects relating to Agriculture, Horticulture, and Stock are issued by the Department, and may be obtained gratis, on application to the Under Secretary.

Farmers who wish to Advertise products, &c., in this "Journal" should address all inquiries in relation thereto to the Manager, Government Advertising Office, Brisbane.

The University of Sydney

Department of Veterinary Science.

The Veterinary School, which is well equipped with the most modern appliances and apparatus, is under the direction of Professor J. Douglas Stewart, M.R.C.V.S., B.V.Sc., late Chief Inspector of Stock and Government Veterinary Surgeon of the State of New South Wales.

The degree granted, i.e., Bachelor of Veterinary Science (B.V.Sc.), is recognised for all public appointments in the Commonwealth. The course of instruction and training is of a progressive nature, and the standard adopted is that of the best Veterinary Colleges in the British Empire. The Hospital and Clinic in connection with the School offer exceptional facilities for practical training.

Next term begins 7th March, 1921.

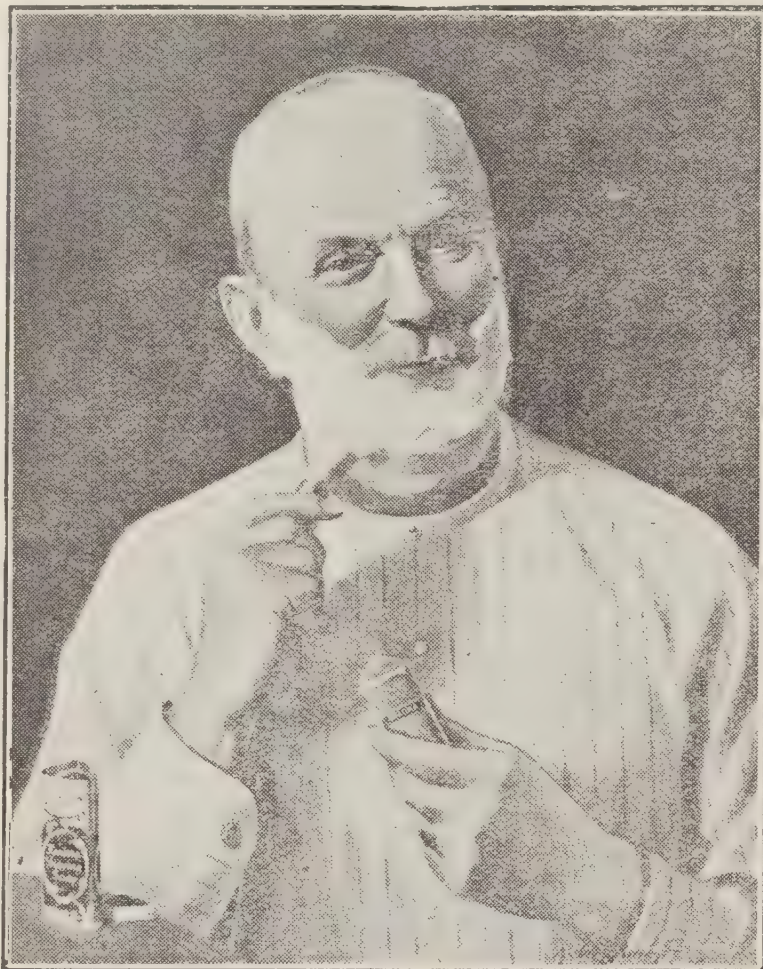
Veterinary Science undoubtedly offers, particularly to those fond of animals, a remunerative and congenial profession, for which a wide field of employment exists.

Full particulars of the curriculum will be forwarded on application.

H. E. BARFF,
Warden and Registrar.

Rexona—The New Triangular Shaving Stick

A High-Class Product for Men of Discrimination.



Mr. Thos. Hawkins (from a painting by Herbert Beecroft).

The following letter tells of a Rexona Shave.

"I am delighted with your **Rexona Shaving Stick**, for it is by far the best I have ever used. I always use a shaving stick, and I think your new triangular stick is a great improvement over the old style of round sticks, and I find that after lathering with the **Rexona Shaving Soap** that the Razor seems to glide over the face much more smoothly. This soap certainly softens the beard in a wonderful manner, and there is no question but that it keeps the skin in far better condition. I have always been a believer in a medicated soap for shaving, and give you the palm for producing one that I consider absolutely ideal. In the past I have noticed that after shaving the skin seemed rough and looked as if it might have been blistered, but such is never the case with **Rexona Shaving Soap**. If this line does not take on in this market, well I miss my guess, and I am sure I wish you every luck.

● Cordially yours,

Thos. Hawkins,

14 Wentworth St., Paddington.

A Rexona Product—watch for the Triangular Stick.

Here is a new idea in shaving soap—another **Rexona** triumph, one this time which will be appreciated by men wherever beards grow. **Rexona Shaving Soap** contains the same oils and essences that have made **Rexona** famous the world over, and is made on the **Rexona** formulae, and thus makes the Shaving Stick, which is a Soap and Lotion combined. It makes for comfort and hygiene shaving, and tempers the skin against wind and bad weather. **Rexona Shaving Soap** is something entirely new in every respect. Watch for the triangular enamel box, for **Rexona Shaving Stick** is not round like the old fashioned kinds, but *triangular*, and packed in a *triangular enamelled box*. Tasty and neat, easy to hold, and dainty in every respect. **Rexona Shaving Stick** is sold at 1/6, or if unable to procure locally, will be sent post free upon receipt of the price 1/6 by the *Sole Proprietors*,

Rexona Proprietary Company,
131-135 Clarence St., Sydney, N.S. W.

Rexona

SHAVING STICK

MEMO. from

W. LOVELOCK & CO. Ltd.

THE ROAD MACHINERY SPECIALISTS

We stock

ROAD GRADERS
ROAD PLOWS
EARTH SCOOPS
WHEELBARROWS

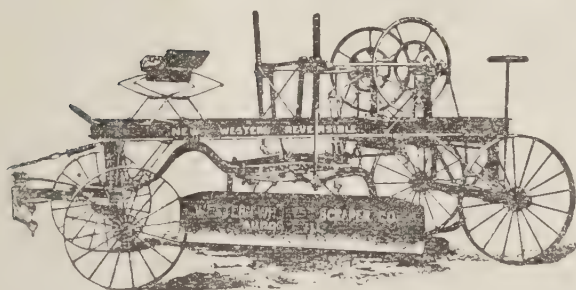
which are largely used by Road-forming Contractors—
Shire Councils—Station Owners—and
Tank Sinking Contractors.

Our Catalogs and Prices will be sent promptly
upon receipt of your enquiry.

PRICES—THE LOWEST.
All Implements Guaranteed.

We illustrate in this Issue

The All-Steel Western Reversible Road Grader
and The Western Road Plow



Remember! It will PAY YOU to BUY from
"Lovelock's," they sell Machinery
and Implements of all kinds.
DON'T BUY until you have got "Lovelock's" Prices.

Address—

W. LOVELOCK & CO. LTD.,
Machinery Specialists,
210 ROMA STREET, BRISBANE.

CO-OPERATION

is the Farmer's Greatest Friend

*It gives him Higher Values for his Products
and Reduces the Selling Charges*

We have pleasure in informing all interested that we have erected **Our Own Fat Stock Yards at Enoggera**, and are prepared to receive consignments immediately—the situation of our Yards is between the Railway Untrucking Yards and the Association Sale Yards.

In our **Resting Paddocks**, adjoining the Yards, there is permanent running water.

Primary Producers are urged to support Co-operation by selling their Stock co-operatively through their own Company. Given reasonable support, it will rapidly extend its usefulness, and provide for many of the Producers Problems. *To-day* it asks for your support in its **Fat Stock Sales** when you have anything suitable for market.

Consign Fat Stock — “Primary Producers,” Newmarket.

**The Queensland Primary Producers'
Co-operative Agency, Ltd., Brisbane.**

Sell, Hire, Purchase, & Exchange Column.

The Minister for Agriculture is desirous of helping in any possible way the men on the land to exchange or dispose of articles that are not required by owners. For instance, one man may have a plough for which he has no further use, another may have a cow—possibly the man with the cow to dispose of may require a plough. To help out this exchange idea, the *Agricultural Journal* will publish advertisements under the above heading at **one penny per word**, name and address included, the amount of which must be forwarded to the Govt. Printer (Advt. Branch), George Street, Brisbane, with the advertisement.

FOR SALE.

Prime Rhodes Grass Seed, any quantity, 1/10 per lb., cash. E. Weiser, Philpott Creek, Queensland.

New Market Cultivator (steel handles), £3. Trehwella Jack (single purchase), £2. 3 Brush Hooks, £1 Fred. Hill, Gayndah.

Prime guaranteed Soudan Grass, French and Japanese Millet Seeds for sale. W. Mogridge, Warwick.

Notice to Cotton Planters.

The Department of Agriculture and Stock is prepared to receive RAW COTTON, gin, and market it on owner's account. An advance of 5½d. per lb. for the year 1920 will be made upon the raw cotton received, and any surplus after sale will be paid to the growers *pro rata* after deducting charges. Consignments are to be forwarded addressed to the Department of Agriculture, Brisbane, who should be advised of the despatch.

Suppliers at the close of the 1919 Season received 5½d. per lb. for their cotton, inclusive of the advance of 2d. per lb.

Wool.—The Department will also receive, on Farmers' account, Wool for classification and sale on their behalf, but the privilege is limited to owners of less than 1,500 sheep. Advances to farmers are made up to 60 per cent. of the estimated value of the consignment. The classing of lots, and the low rates of commission obtained, is of considerable benefit to small growers.

Why the “Daily Mail” has become the greatest newspaper in Queensland

*Old things give place to new, the
methods of yesterday are like faded
flowers—fit only to be cast aside.
There is not an idea that goes to
make a better newspaper that we
have not adopted.*

The Latest Development.

We have secured the services of Mr. H. N. LEACH, who is looked upon in the Country as the Farmers' Greatest Friend. He is touring Queensland at present having heart to heart talks with the man on the land—getting at his problems first hand, and in our columns fighting his battles for him. Already thousands of farmers are requesting the “Daily Mail” for this feature only, but whether it be the cause of

**The Man on the Land,
The Commercial Information,
“Sirdar’s” Racing News, or
General News,**

“The Daily Mail,” Brisbane, is foremost to-day.

Reuter's, “London Times,” and United Cable
(exclusive Morning Cable Service.)

Subscription Rates :

Quarterly (Posted) -	-	14/-
Half-yearly „ -	-	28/-
Yearly „ -	-	56/-

A NEW *Fertilizer* Company



The Australian Fertilizers
— Proprietary Limited —

with a Capital of

£500,000

has taken over the old-
established Business of

George Shirley Limited,

and is now manufacturing
— the Famous —

Shirley Fertilizers
for all Crops

in Increased Quantities.

Write to—

Head Office: 7 O'CONNELL STREET, SYDNEY.

VICTOR GREEN,
Business Manager.

Queensland Agricultural College.

The College is situated in the centre of the Lockyer Valley, 4 miles from the town of Gatton, and 1 mile from College Siding. It has accommodation for 60 Students.

The Syllabus provides for—

1. A three years' course in **General Agriculture and Animal Husbandry**, leading to the **Agricultural Diploma**.
2. A two years' course specially designed to qualify Students for **Dairy Factory Management**, and leading to the **Dairy Diploma**.
3. Short courses of from six to twelve months in various sections of the farm, and suitable for those not qualified to take either of the Diploma courses.

FEES.

Board and tuition for any course £27 per annum, payable half-yearly in advance. A Guarantee deposit of £2 must be paid on entering the College and annually thereafter; 10s. each for Medical and Sports fees respectively are payable each half-year.

Full details and application forms may be had from the Under Secretary, Department of Agriculture, Brisbane, or the Principal of the College.

Age of Entry.

Candidates must not be less than sixteen years of age.

Bursaries.

An examination will be held in December next, in Brisbane and elsewhere, according to where the candidates reside, for four Bursaries at the Queensland Agricultural College, tenable for three years. Candidates must not be less than sixteen or more than eighteen years of age on 1st January, 1920.

Full particulars and conditions on application to

The Under Secretary,
Department of Agriculture and Stock, Brisbane.

SEEDS FOR SALE

GRAIN SORGHUMS

Giant Honduras 1/- per lb.

SACCHARINE SORGHUMS

Saccharine 1/- per lb.

APPLICANTS TO AVOID DISAPPOINTMENT SHOULD MAKE A SECOND CHOICE, AS A KEEN DEMAND EXISTS FOR THIS CLASS OF SEED.

BROOM MILLET

White Italian, price 6d. per lb.

THE ABOVE PRICES ARE F.O.R., BRISBANE.

Remittance should accompany order, and be addressed to the *Under Secretary for Agriculture & Stock, Brisbane.*

Full instructions should be sent concerning despatch of seed, and in the event of the destination noted being a prepaid railway station, the cost of freight by "RAILWAY PARCEL," or "GOODS" should be added to remittance.

In the event of seed being sent by boat, applicants should advise name of agent to whom goods should be forwarded.

White Muscovy Ducks

The largest and finest bred in Australia!

Drakes, 21/-, 35/-, 42/-, each.

Ducks, 15/-, 21/-, 42/-, each.

Trios, £3 3s. Pens, £4 4s.

Baby Ducklings, 21/- doz.

Hatching Eggs, 20/- setting.

Secure your Males now.

Book on Muscovy Breeding, 1/6.

White Leghorns

Graceful and beautiful, everlasting layers.

Cockerels and Pullets, ready

March-April £2 2s. each.

Day old Chicks, 21/- doz.

Illustrated Catalogues of Leghorns

or Ducks mailed post free, write

now for your copy.

R. T. G. Carey,

Pindora Poultry Farm,

Beerwah, N.C. Line, Queensland.

White Leghorns

Winner of

Gatton College Competitions,

1916-17, with 1,542 eggs.

1919-20, with 1,596 eggs.



Winner of Single Hen Test, Gatton College, 1918.

Winner Birkdale Competition, 1918.

Winner of Winter Test, Gatton College, 1919.

Cockerels and Pullets, fully related to my present pen at Gatton College, April-May delivery, £2 2s. each. Two years' old stud hens, immediate delivery, £1 1s. each.

When buying get the best.

Correspondence Invited.

J. M. MANSON,
YERONGA, BRISBANE.

Queenton Acclimatised Seeds

*Early Jewel Tomato—the most prolific tomato grown.
Ponderosa Tomato, selected for good-shaped fruit.*

*Crested Cosmos, the only strain giving up to 60% true.
Giant Zinnias, Striped Zinnias, Double and Single Dianthus, Marguerite Carnations.*

All 6d.
per packet.

E. Mann, Seed Grower,
Charters Towers.

Yeerongpilly Stock Experiment Station

Owing to the Increases in Cost of Chemicals, etc., the following charges are made for the preparations mentioned as from

1st June, 1918.

Pleuro Virus	- 4/- per 50 animals.
Blackleg Vaccine	} 4/- " 10
(Powder Form) Tubes	} (double doses)."
Lactic Cultures	- 1/6 per bottle.

Tested Blood for Tick	} 6d. per dose with a minimum charge of 1/6 (1 dose for 1 animal).
Fever Inoculation	

Stud Animals received and stalled for Tick Fever Inoculation, 3/- per day (agistment charges extra).

Cash must accompany the order in each case, and all applications are to be addressed to

The Govt. Bacteriologist,
Stock Experiment Station,
Yeerongpilly, near Brisbane.

The Eggs Increased

The "Australian Hen" reports in a recent issue :—

"We recently selected 20 young hens, picking them so as to get two pens of ten as near alike as possible.

"These birds were put on a ration composed of equal parts by measure of pollard, bran and scalded lucerne chaff, on December 1st, and allowed to run on that for a month to test their equality.

"The ration was mixed with liver soup, and they had boiled liver added to the mash twice weekly. That was all the animal food they had, and it must be remembered that in the table of results no account has been taken of the meat food, as they were both impartially served during the whole of the test.

"On the 1st of January, to the ration of pen No. 1 was added scalded Sunlight Oil Cake, replacing half the bulk of bran. By a careful test we found that bran and Sunlight Oil Cake gave about the same amount of scalded food for a given sum—that is, while the Sunlight Oil Cake was dearer to buy, weight for weight, it swelled to a much greater extent than bran, and a quart of scalded bran would cost as much as a quart of scalded Sunlight Oil Cake, as near as it was possible to compute it. Thus, in doing away with half the bran, and keeping up the same bulk of mash with Sunlight Oil Cake, the cost of feed was not increased; as a matter of fact, after the Sunlight Oil Cake was added, we found that the birds did not consume quite as much food as they did before its addition. It is to be understood, therefore, that the addition of Sunlight Oil Cake was not an expense, but rather inclined to be a saving, as far as the cost of food is concerned.

"The trial was continued for three months, and the birds were then again put on the plain ration, without the Sunlight Oil Cake.

"The results of the test, as far as the production of eggs is concerned, were as under :—

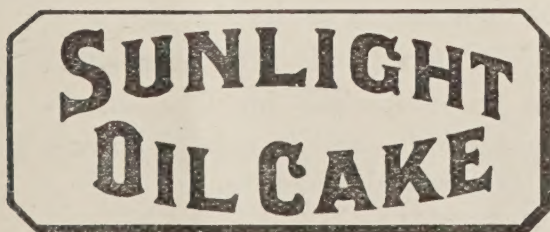
No. 1 (Sunlight Oil Cake).					
Dec.	Jan.	Feb.	Mar.	Apr.	Total.
235	210	157	201	117	920
No. 2 (without Oil Cake).					
Dec.	Jan.	Feb.	Mar.	Apr.	Total.
247	174	150	83	67	721

"In all other respects but those mentioned, the birds were treated alike. The number of eggs laid by even the plain pen is proof that they were not neglected."

Write to **LEVER BROTHERS LIMITED, SYDNEY,**

For Post Free Booklet—"POULTRY PROFITS,"

By L. A. SAUNDERS, of "Farm Journal."



Guaranteed Pure

See that the name "Sunlight" is
branded on every cake.

Advertisers

and Others Concerned

are notified that all Communications concerning Advertising in this Journal should be addressed to
The Government Printer, George St., Brisbane.

STUMP GRUBBING

Does not now mean a lot of hard back-breaking work with pick, shovel, and axe. It means just a few minutes with the



Trewhella Monkey Grubber

and you have the stump or tree right out, roots intact. The machine is light, portable, powerful, simple, and easy to rig and operate. Can be worked anywhere in any position. Two men can carry it comfortably, and it is built for hard rough usage.

British Material.—Think what this means to you, then act.—**British Workmanship.**

WHAT IS YOUR
ADDRESS, PLEASE?

A. ROBINSON, 549 Queen St., Brisbane.

DEPARTMENT OF LABOUR

(CONTROLLED BY THE STATE GOVERNMENT).

NO CHARGES—NO FEE.

Central Labour Exchanges have been established at Cairns, Townsville, Rockhampton, Bundaberg, Brisbane, Ipswich, and Toowoomba.

Employers who are in need of Labour, and Employees who are looking for work, may have the services of the "Free Exchanges" by using the Letter Cards supplied without charge at all Post Offices, or otherwise communicating their needs to the nearest Exchange.

WOMEN WORKERS.

An Employment Agency for all classes of Women Workers is conducted at 140 Adelaide Street, Brisbane. The Agency has for its purpose the better organisation of the Market for Women's Work. Employers are invited to call, write, or wire the Manageress, who will give immediate attention to all applications and inquiries. Women Workers desiring employment of any kind are invited to enrol their names at the Agency.

NO CHARGE IS MADE FOR THE SERVICES OF THE AGENCY.

The Agency deals with all classes of occupations for Women, including Home Work, Educational Work, and Employment in private houses, Offices, Shops, Hotels, Restaurants, Workrooms, and Factories.

F. E. WALSH, Director of Labour.

The "EUREKA" PATENT MILKER

If it were only for the increased milk yield, due to its uniform working, the "EUREKA" Milker would be the dairyman's best investment. Then it saves time and expense—one man can do the work of two. The "EUREKA" is the safe Milker! No chance of injuring valuable cows. Its action is as the suck of the calf. The "EUREKA" Coaxes—it doesn't force.

The "EUREKA" must be more than
"ordinarily good" for Mr. G. E. J.
Chaseling to write as follows—

"I have been using the 'EUREKA' Milking Machines now for 3 years. They have been more than satisfactory; they have been a constant pleasure to use. The total upkeep has been about three pence a unit a week. I am pleased you have the 'EUREKA.' I don't think there is a superior made."

There you have it—a short, but splendid tribute, right from the dairy. This is not an isolated experience—we have dozens of such letters. You must be vitally

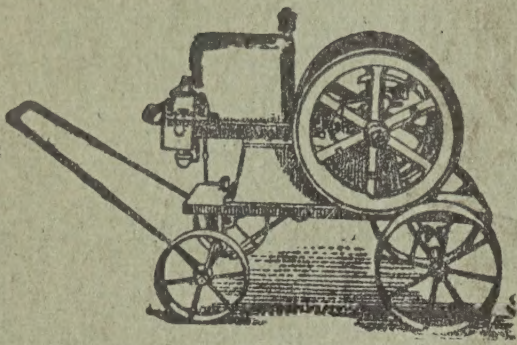
**SPARE
PARTS
for the Eureka
always on
Hand**

interested in other dairymen's experiences. They are safe guides. They point the way to better results—greater profits—and, above all, clearly indicate the right appliances—devices—or engines to buy to bring your dairy up-to-date.

Write for Booklets and Prices, etc.

Clark & Pauset Ltd.
ESTD ENGINEERS & MACHINERY MERCHANTS 1881
73-81 EAGLE STREET, BRISBANE.

Two of the Best

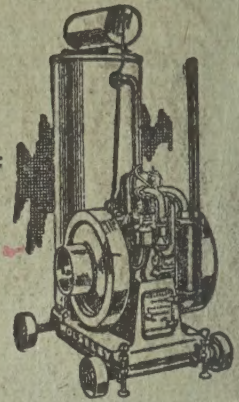


"Kerosene Bill"—the old reliable

He is a tough customer is "Bill"—without frill and does nicely on Kerosene—thank you. Full name the

Buzacott all-purpose Engine

"Kerosene Bill" is the original. No other engine is so hardened to work. Cuts chaff—wood—threshes—shears—separates—and does it at a low cost. Works day and night—needs no attention once started—nor mechanical knowledge to operate—a wonderful engine.



Work made easy

The farmer's work, like woman's, is never done, but it is possible to get a lot more done in a day if you have a

"Wolseley" Petrol Engine

The "*Wolseley*" will do all the hardest and most tiring farm jobs in double quick time. The women folk can look after it if necessary—no expert skill being required. The "*Wolseley*" is made in Britain's best Engine Works, from the very best materials. It is, therefore, an engine you can depend on absolutely. Upkeep cost is reduced to a minimum, and running expenses are trifling considering the work you get through, the time and labour you save.

Write to Desk B 1
for full particulars.

Buzacott's

(QUEENSLAND)
LIMITED

"You can get it at Buzacott's,"

Adelaide St., Brisbane.

Also Market St., Sydney.